ORDER No.AD9905119C2

Service Manual

Mini Disc Deck

SJ-HD505

Colour

(S).....Silver Type

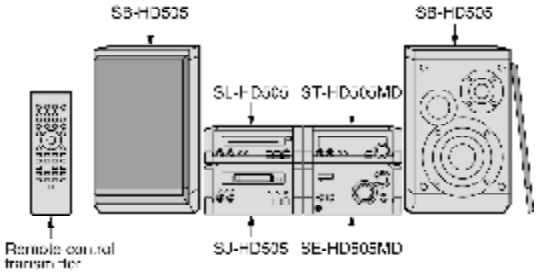
Area

E.....Europe.

System: SC-HD505MD

Because of unique interconnecting cables, when a compact requires service, send or bring in the entire system.

Note:Refer to the service manual for Model No.SE-HD 505MD(ORDER NO.AD9904116A2) for information on “ACCESSORIES”, “INSTALLATION”, “CONNECTIONS” and “PACKING”



SPECIFICATIONS

Specifications

Mechanism unit:MR3 (RAJ3402) Mechanism Series

■ **Digital input/output terminal**

Input:	**Optical x2**
Output:	**None**

■ **Format**

Sampling frequency:	**44.1 kHz**
Sampling late converter	

■ **Pickup**

Wavelength:	**780nm**

■ **General**

Dimensions (WxHxD):	**202x104.5x254mm**
Weight:	**1.4kg**
Power supply:	**DC10V**
Power consumption:	**10W**

Notes:

1. **Design and specifications are subject to change without notice.**
2. **Dimensions and weight are approximate.**
3. **Total harmonic distortion is measured by the digital spectrum analyzer.**

System/SC-HD505MD:

Tuner:ST-HD505MD, Compact Disc Player:SL-HD505, Amplifier :SE-HD505MD, Mini Disc Deck:SJ-HD505, Speakers:SB-HD505 (Made in MAES.)

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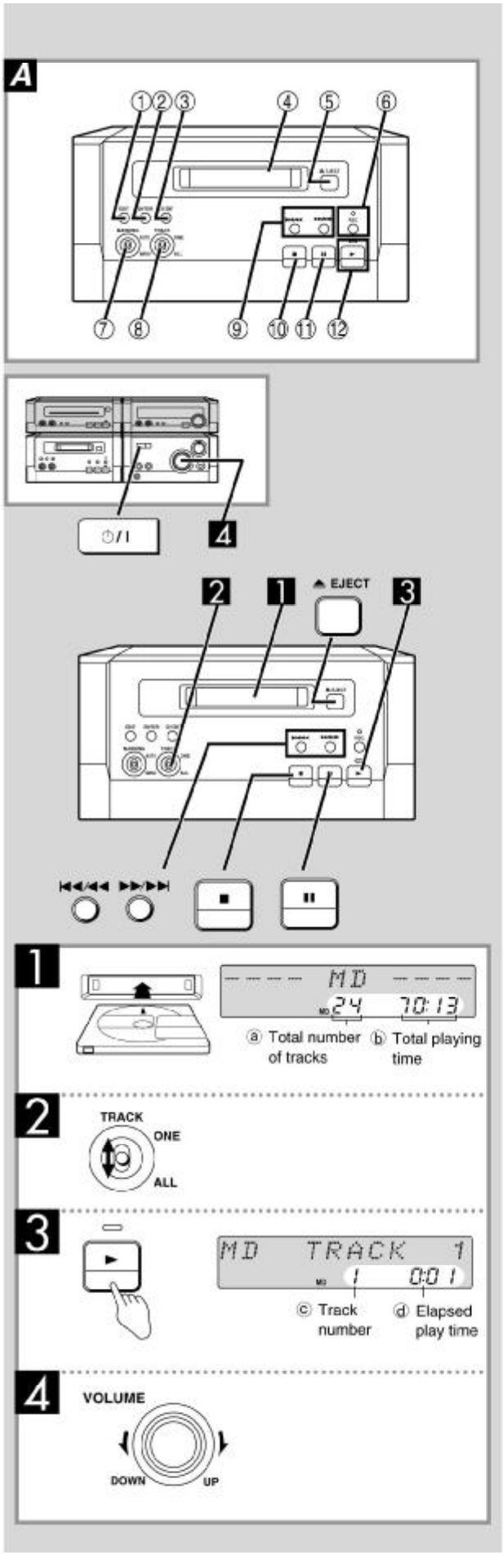
⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

1. Blue LED

- **The LED mounted to each side of the front panel of this set is very sensitive to static electricity. When handling the LED base plate, be very careful about it.**
- **Do not replace a blue LED singly. If replaced singly, it may be subject to electrostatic breakdown or deterioration in quality.**



Front panel controls

A MD deck

① **Edit button (EDIT)**
② **Enter button (ENTER)**
③ **CD edit recording button (CD EDIT)**
④ **MD slot**
⑤ **Eject button (▲ EJECT)**
⑥ **Record button and indicator (REC)**
⑦ **Marking mode select switch (MARKING)**
⑧ **One track/all tracks switch (TRACK)**
⑨ **Skip/search buttons (⏮/◀◀, ▶▶/⏭)**
⑩ **Stop button (■)**
⑪ **Pause button (❚❚)**
⑫ **Playback button and indicator (▶)**
The color of the indicator the button depends on the operation taking place.
If stopped: orange
If playing or recording: green

MDs

1 Insert the MD.
The unit comes on automatically and if MD input is selected, the message "TOC Reading" flashes on the display, then any text information about the disc is shown.

2 Select "ALL" or "ONE" with [TRACK].
ALL: all tracks are played.
ONE: one track is played.

3 Press [▶] to start play.

4 Adjust the volume.

To stop the disc
Press [■].

To pause play
Press [❚❚] during play. Press [❚❚] or [▶] to resume play.

Skipping tracks
Press [⏮/◀◀] (backward) or [▶▶/⏭] (forward).

Searching through tracks
During play
Press and hold [⏮/◀◀] (backward) or [▶▶/⏭] (forward).

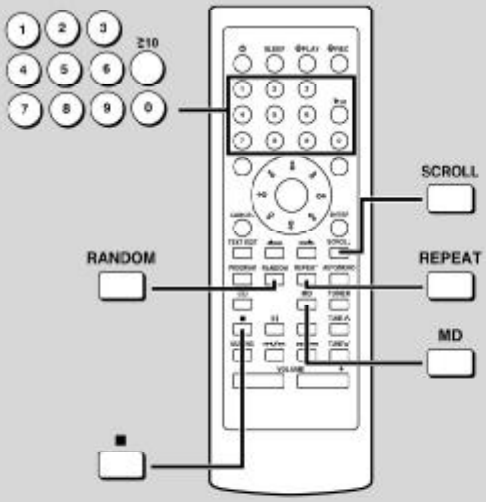
Note

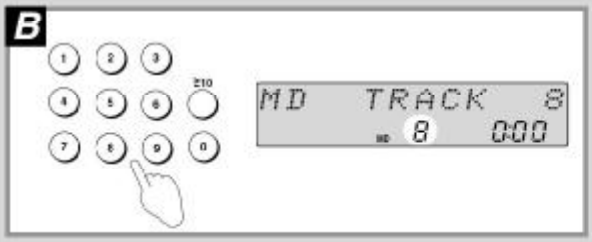
You cannot skip to tracks already played in random play.
Skipping is done in the selected order in program play.
You can search only within tracks in random play.

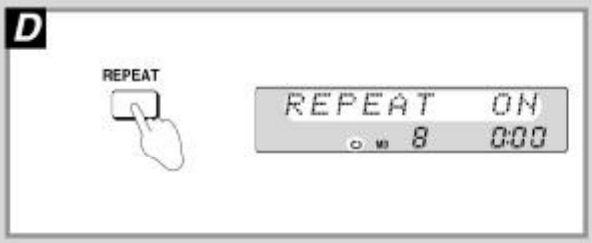
To eject the MD
Press [▲ EJECT]

One touch play

When a MD is loaded and the unit is off, press [MD] on the remote control. The unit comes on and starts play.







Other MD functions

Remote control only

Preparation

Press [MD] to put the unit in the required mode.

A Scrolling the text

Press [SCROLL] on the remote control.

"SCROLL ON" is shown and the selected information scrolls across the display.
Press [SCROLL] again to cancel.

Note

Scroll does not work if the text is less than 12 letters.

B Direct access play:

Starts normal play from a selected track

Select the track with the numbered buttons.

For tracks numbered 10 and over, press [10] then the two digits.
For tracks numbered 100 and over, press [10] twice then the three digits.

C Random play:

Plays the tracks once each in random order

Press [RANDOM]. (MD must be stopped)

To cancel

Press [■]. "RANDOM" goes out.

D Repeat:

Repeats all tracks or programmed tracks

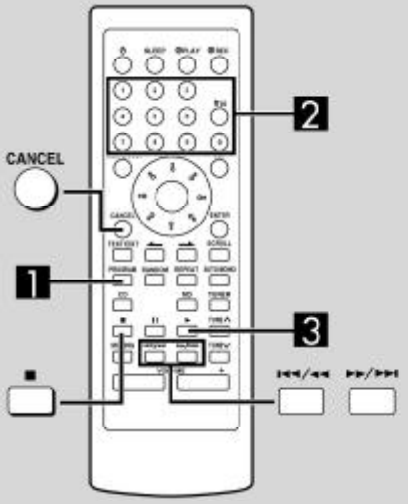
Press [REPEAT] before or during play.

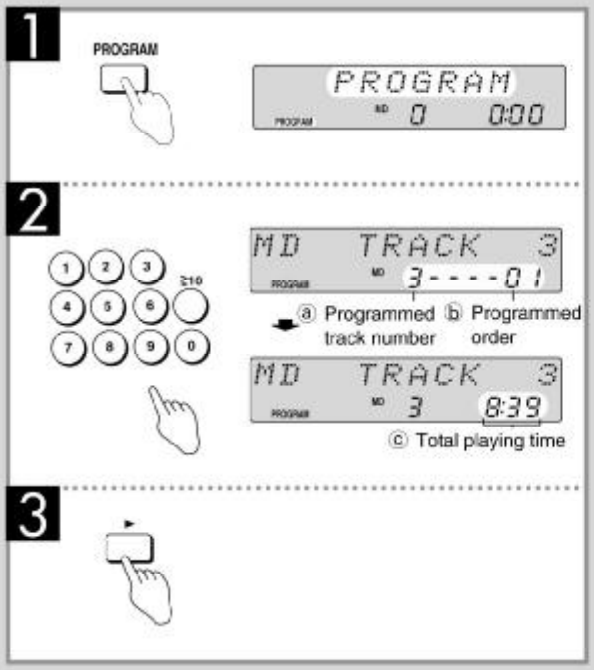
To cancel

Press [REPEAT]. " ↻ " goes out.

Repeating one track

1. Select "ONE" with [TRACK] on the MD deck or CD player.
2. Press [REPEAT] to display " ↻ ".
3. Select the track with the numbered buttons.





Other MD functions

Remote control only

Program play:
Select up to 24 tracks to play in the order you choose

Preparation

Press [MD] to put the unit in the required mode.

1 **Press [PROGRAM].**

2 **Enter the track number with the numbered buttons.**
For tracks numbered 10 and over, press [10] then the two digits.
For tracks numbered 100 and over, press [10] twice then the three digits.
Repeat this step to program the tracks in the required order.

3 **Press [►].**
All the tracks are played in the selected order.

To cancel program play
Press [PROGRAM]. (MD must be stopped)
"CLEAR" is displayed and all the tracks are canceled.

"FULL" is displayed
24 tracks have been programmed.

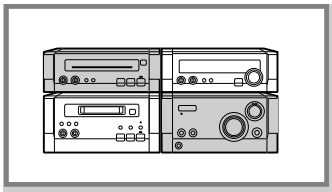
"– –:– –" is displayed
Total playing time for the tracks is over 199 minutes and 59 seconds, or a CD track numbered 25 or over was programmed. Tracks can still be programmed and played.

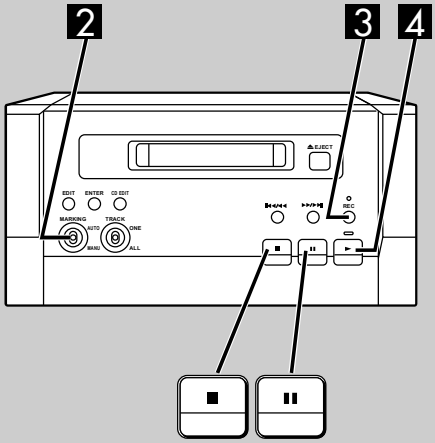
To check the contents of the program
Press [I◄◄ / ◄◄] or [►► / ►►I] while stopped. The track numbers and program positions are displayed in order.

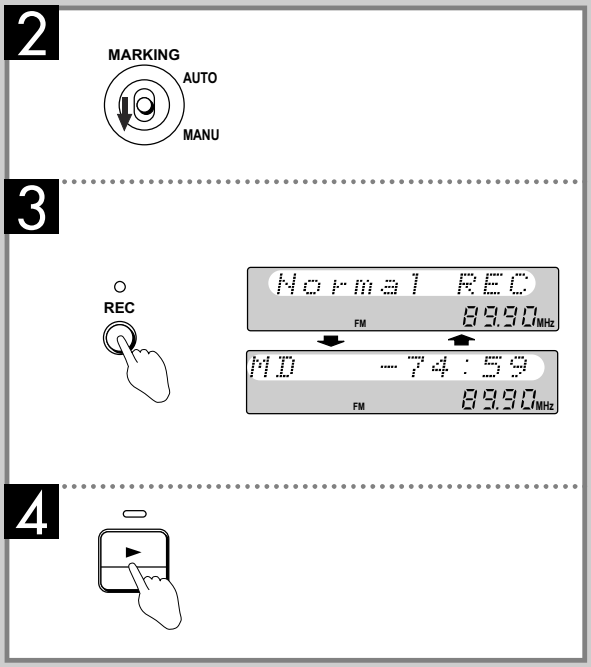
To add to the end of the program
Repeat step 2. (MD must be stopped)

Canceling tracks (only while stopped)

From the last track	Press [CANCEL]. "CANCEL" is displayed.
A particular track	Select the track with [I◄◄ / ◄◄] or [►► / ►►I] then press [CANCEL].
All tracks	Press [■]. Program play is also cleared.







Recording the radio

Preparation: Insert an MD.

1 **Tune to the required station.**

2 **Select "MANU" with [MARKING].**
Insert the track marks where required during recording (see below) or with the editing functions after recording.
Recording is still possible if "AUTO" is selected but you will not be able to add track marks during recording.

3 **Press [REC].**
The deck goes into the recording standby mode and the [▶] indicator starts flashing. "Normal REC" and the remaining time on the MD flash on the display.

4 **Press [▶].**
Recording starts.

To stop recording
Press [■].
Recording is complete after the message "UTOC Writing" stops flashing on the display.
Do not disconnect the unit from its power source while this message is flashing. This can cause the recording to be erased and damage the disc.

To pause recording
Press [▮▮].

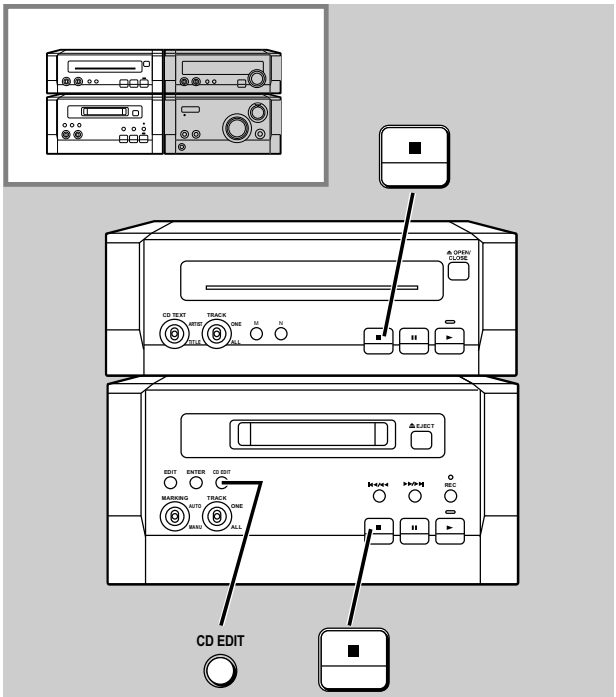
The deck goes into the recording standby mode and the [▶] indicator starts flashing. If "AUTO" was selected in step 2, a track mark is added.
Press [▶] to resume recording.

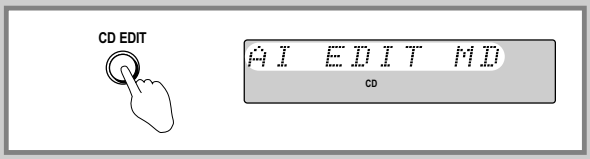
Adding track marks while recording (when "MANU" is selected)
Press [REC] where the track mark is required.
These marks can be removed after recording with the editing functions.

Your attention is drawn to the fact that recording pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

Volume and sound quality
Recordings are unaffected by changes to volume and sound quality.

To display the remaining time on the MD
Press [DISP/CHARA] on the remote control.





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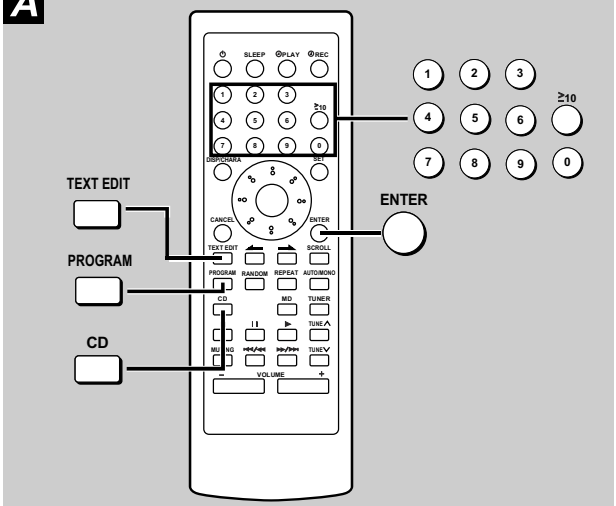
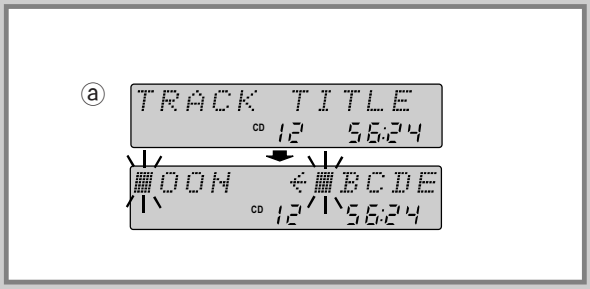




Recording CDs

One touch recording (AI EDIT)

This function automatically records up to 24 tracks from the CD onto the MD as long as the time remaining on the MD allows.
Track marks are inserted automatically.

Preparation: Insert an MD and CD

Press [CD EDIT].

"AI EDIT MD" is shown on the display and recording starts.

To stop editing

Press [¡] on the MD deck or CD player.
Both sections stop, "UTOC Writing" flashes on the display and when "EDIT OUT" appears on the display recording is complete.
Do not disconnect the unit from its power source while this message is flashing. This can cause the recording to be erased and damage the disc.

A **Recording programmed tracks**

On the remote control
1. Press [CD].
2. Press [PROGRAM].
3. Select the tracks with the numbered buttons.

On the MD deck
4. Press [CD EDIT].

Recording CD Text discs

The titles from the CD can be recorded easily onto the MD.
After recording CD text discs, the display automatically shows the text editing display (ⓐ).
To enter the text as it is:
On the remote control
Press [ENTER].
To clear the titles:
Press [¡].
The titles can be changed with the text editing functions after recording is finished.

Manual recording

Preparation: Insert an MD and CD.

1 Select the marking mode with [MARKING].

AUTO: Track marks are automatically recorded from the CD.
MANU: Insert the track marks where required during recording (see below) or with the editing functions after recording.

2 Press [REC].

The deck goes into the recording standby mode and the [▶] indicator starts flashing. “Normal REC” and the remaining time on the MD flash on the display.

3 Press [▶] on the CD player.

Recording starts.

To stop recording
EITHER
Press [¡] on the CD player.
The CD stops but the MD deck goes into recording standby mode.
OR
Press [¡] on the MD player.
Recording stops but the CD continues playing.
Recording is complete after the message “UTOC Writing” stops flashing on the display.
Do not disconnect the unit from its power source while this message is flashing. This can cause the recording to be erased and damage the disc.

To pause recording
EITHER
Press [▮▮] on the CD player.
The CD and MD deck pause. Press [▶] on the CD player to resume recording.
OR
Press [▮▮] on the MD deck.
The MD pauses but the CD continues playing. If “AUTO” was selected in step 1, a track mark is added.

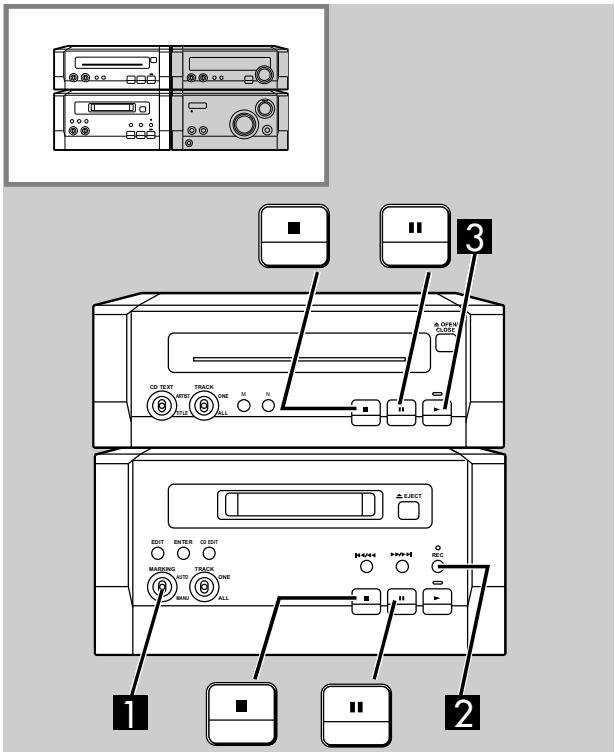
Adding track marks while recording (when “MANU” is selected)
Press [REC] where the track mark is required.
These marks can be removed after recording with the editing functions.

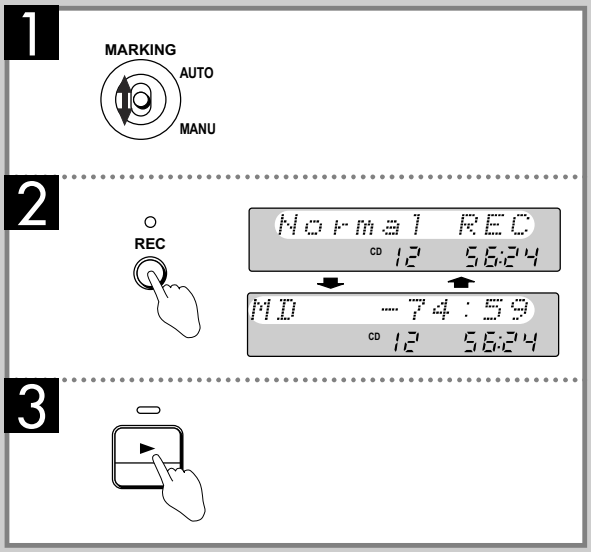
A Recording programmed tracks

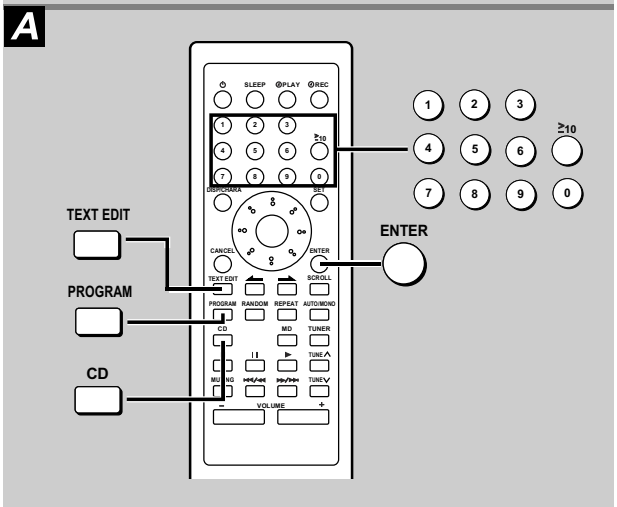
1. Press [CD].
2. Press [PROGRAM].
3. Select the tracks with the numbered buttons.
4. Follow the procedure for manual recording.

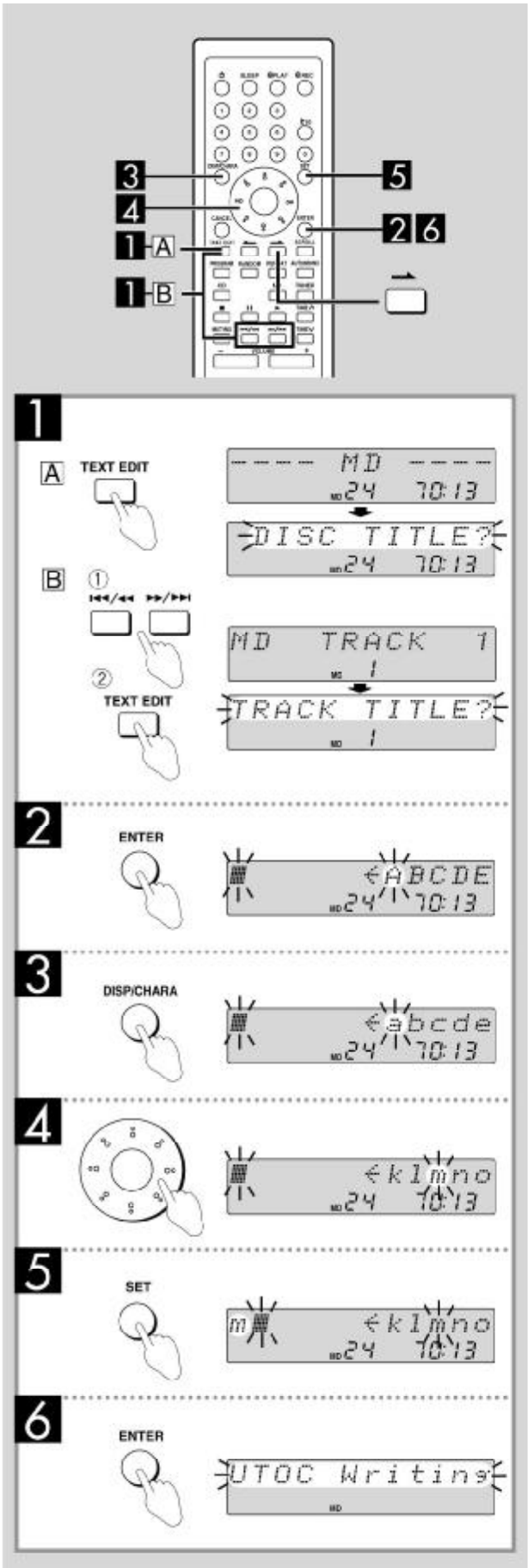
Recording CD Text discs
The titles from the CD can be recorded easily onto the MD.
While a track is being recorded
1. Press [TEXT EDIT].
2. Press [ENTER].

The titles can be changed with the text editing functions after recording is finished.









Titling discs and tracks

Remote control only

Titles of up to 100 characters long can be given to an MD and the tracks on it.

Preparation: Press [MD]

1 A To title a disc

Press [TEXT EDIT] while the disc is stopped.

"DISC TITLE ?" flashes on the display.

B To title tracks

① Press [⏮/◀◀] or [▶▶/⏭] to select the track while the disc is stopped.

② Press [TEXT EDIT].

"TRACK TITLE ?" flashes on the display.

2 **Press [ENTER].**

The text editing display appears.

3 **Press [DISP/CHARA] to select the type of character.**

Each time you press the button:

CAPITALS/symbol ▫ lower case/symbol ▫ Numbers

4 **Turn the dial to move the right-hand cursor over the required character.**

Press [⎵] to leave a space.

5 **Press [SET] to enter the character.**

The letter appears on the left-hand side of the display.

Repeat steps 3 to 5 to complete the title

6 **Press [ENTER].**

Titling is complete after the message "UTOC Writing" stops flashing on the display.

To cancel partway through titling

Press [TEXT EDIT].

The previous display is restored.

Titling a track while recording or playing it

Tracks can be titled by following the above steps.

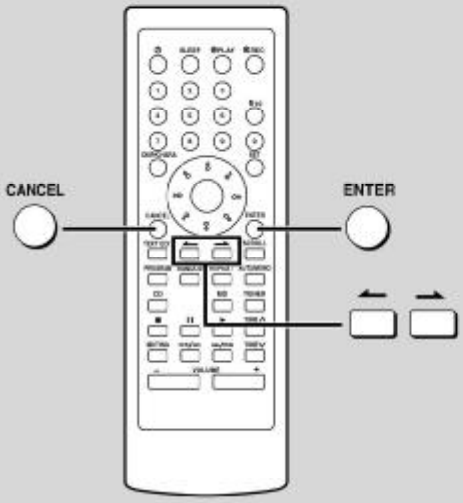
Titling can be continued even after the track finishes recording.

When titling during playback, the track plays repeatedly until you are finished.

The title is entered after play stops and "UTOC Writing" disappears from the display.

Note

If the unit is in the titling mode and an operation is not performed for a long time, the display may not respond when the dial is turned. If this occurs, press another button (one of the volume buttons, for example) and operation should return to normal.



Titling discs and tracks

Characters available for titles

Text mode	Character (◌ : space)
CAPITALS/ symbol	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z ◌ ! " # $ % & ' ( ) * + , − . / : ; < = > ? @ _ `
lower case/ symbol	a b c d e f g h i j k l m n o p q r s t u v w x y z ◌ ! " # $ % & ' ( ) * + , − . / : ; < = > ? @ _ `
Numbers	0 1 2 3 4 5 6 7 8 9

Editing titles

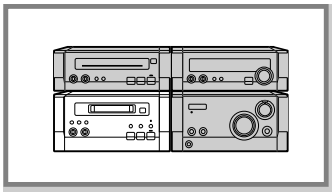
To move the cursor
Press [←] or [→].

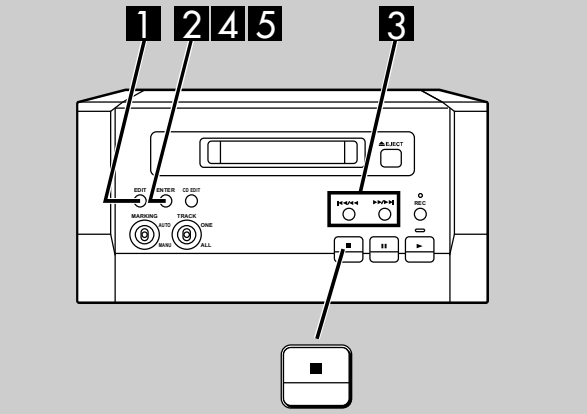
Erasing letters
Move the cursor over the letter to be erased and press [CANCEL].
The letter is erased and the letters move back to fill the space.

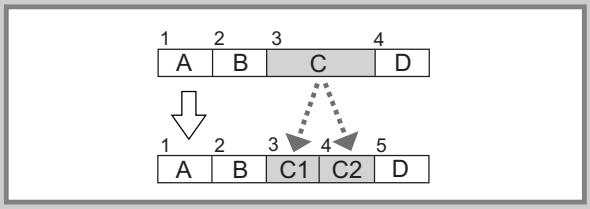
Inserting a letter or space
Move the cursor over the letter to the right of the place where the new letter or space is to go.
Now select and enter the new letter.

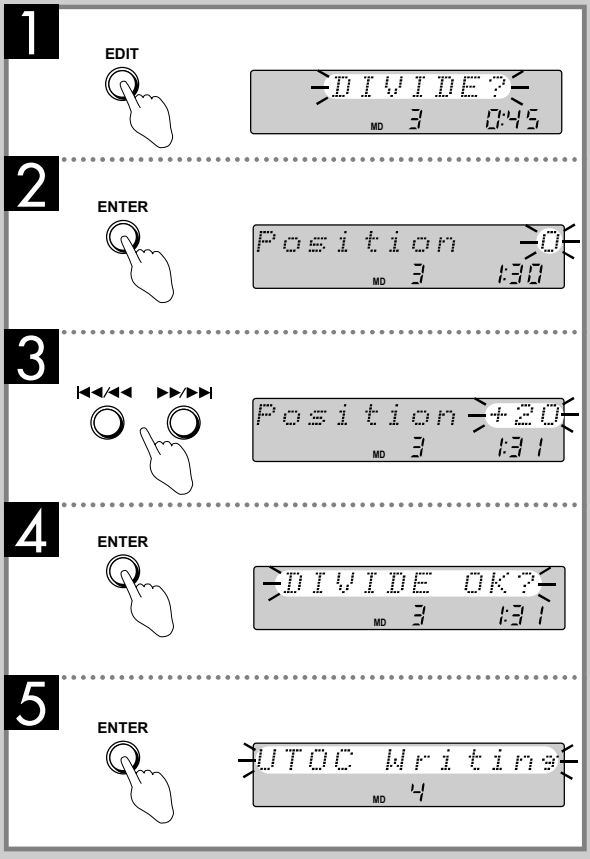
Replacing letters
1. Erase the old letter.
2. Insert the new letter.

Making corrections to a title
1. Select the title to be corrected.
2. Use the above editing techniques to correct the title.
3. Press [ENTER].









Dividing tracks - DIVIDE

This function allows you to manually add track marks.
You can edit a recording of a radio program or divide a symphony into its separate movements.
Adding track marks will not interrupt sound.

Make sure the disc is record enabled.

Play the track you want to divide.

1 **Press [EDIT] to select "DIVIDE ?."**
Each time you press the button:
DIVIDE ? ¤MOVE ? ¤COMBINE ? ¤TRACK ERASE ? ¤ current display
"COMBINE ?" will not be displayed if you are playing track number 1.

2 **Press [ENTER] at the approximate point you want the track mark to go.**
A four second segment of the track, beginning at the selected point, is played repeatedly.

3 **Press [|◀◀ / ◀◀] or [▶▶ / ▶▶|] to adjust the point.**
Adjustments can be made between –128 and +127, approximately 8 seconds either side of the original point.

4 **Press [ENTER].**
"DIVIDE OK ?" flashes on the display.
If you wish to cancel press [¡] now, or you can readjust the position with [|◀◀ / ◀◀] or [▶▶ / ▶▶|].

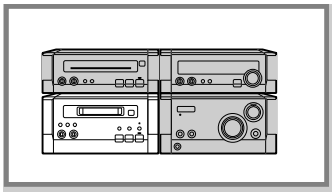
5 **Press [ENTER] to confirm the new track mark position.**
Play stops and "UTOC Writing" flashes on the display. When this stops flashing the new track mark has been entered.

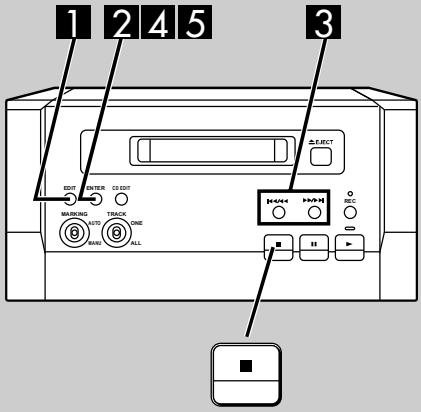
Stopping part way through
Press [¡] at any point.

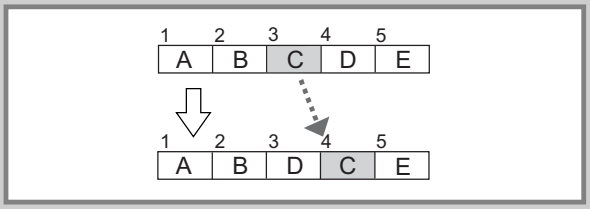
To remove the track mark again
Use COMBINE.

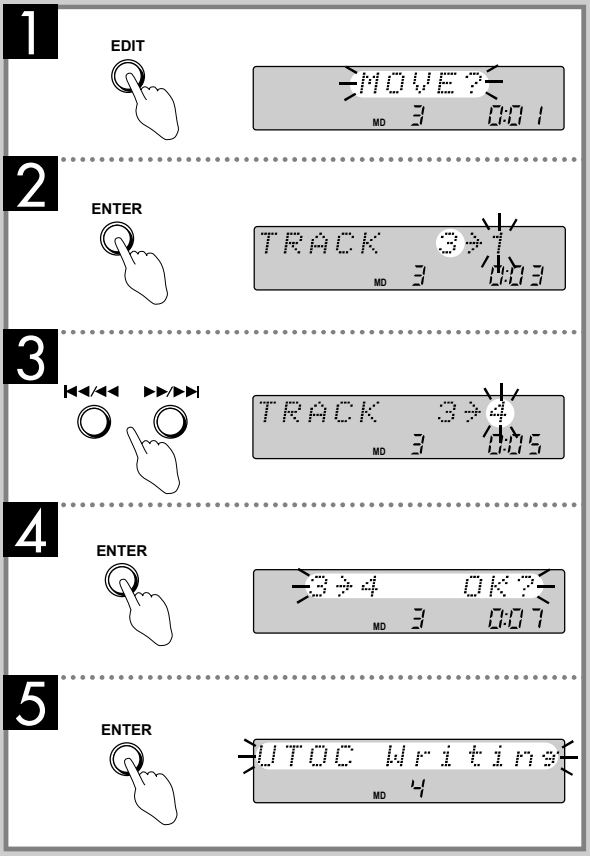
Note

If you divide a titled track, the part after the new track mark becomes untitled.









Moving tracks - MOVE

This function allows you to permanently change the order tracks are played in.

Make sure the disc is record enabled.

Play the track you want to move, or select it with [I◀◀ / ◀◀] or [▶▶ / ▶▶I] while the player is stopped.

1 **Press [EDIT] to select "MOVE ?".**
Each time you press the button:
DIVIDE ? ¤MOVE ? ¤COMBINE ? ¤TRACK ERASE ? ¤ current display
"DIVIDE ?" is only displayed if the track is playing.

2 **Press [ENTER].**
The current number of the track is shown and the new position flashes to the right of it.

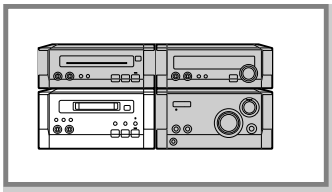
3 **Press [I◀◀ / ◀◀] or [▶▶ / ▶▶I] to select the new track number.**

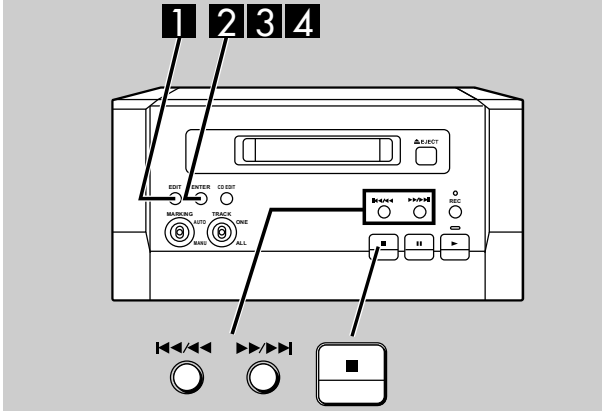
4 **Press [ENTER].**
The old track number and new track number flash on the display.
If you wish to cancel press [¡] now.

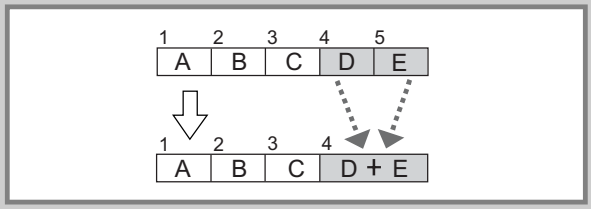
5 **Press [ENTER] to confirm the new track number.**
Play stops and "UTOC Writing" flashes on the display. When this stops flashing the new track number has been entered.

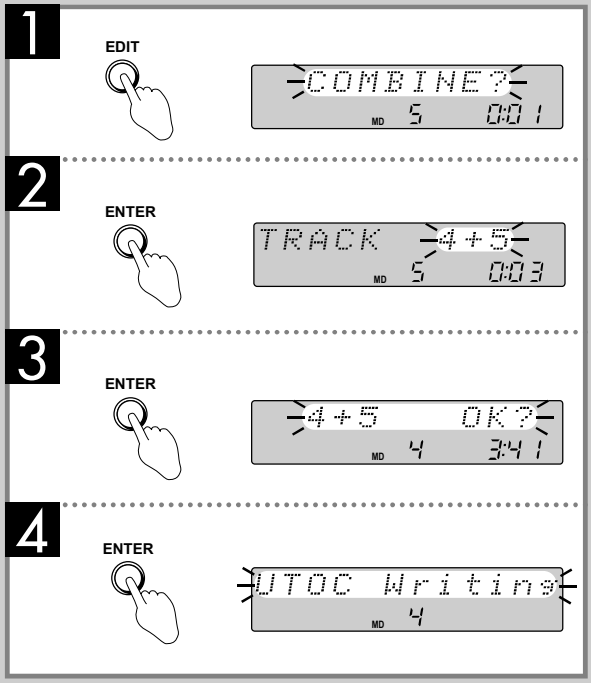
To cancel part way through
Press [¡].

To return the track to its original position
Repeat the above steps, selecting the track's original number in step 4.









Combining tracks - COMBINE

This function removes track marks so the tracks either side effectively become one track.

Make sure the disc is record enabled.

Play the track that comes after the track mark you want to remove, or select it with [⏮/◀◀] or [▶▶/▶▶⏭] while the player is stopped.

1 **Press [EDIT] to select "COMBINE ?".**
Each time you press the button:
DIVIDE ? ¤MOVE ? ¤COMBINE ? ¤TRACK ERASE ? ¤ current display
"DIVIDE ?" is only displayed if the track is playing.
"COMBINE ?" will not be displayed if you are playing track number 1.

2 **Press [ENTER].**
The track numbers to be combined flash on the display.
You can change the tracks to be combined at this stage by pressing [⏮/◀◀] or [▶▶/▶▶⏭].

3 **Press [ENTER].**
If you are playing a track, the unit plays a segment of music starting eight seconds before the old track mark and continuing eight seconds after it.
If you wish to cancel press [¡] now.

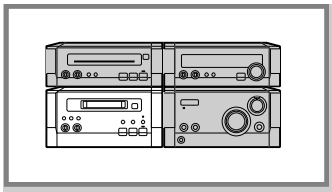
4 **Press [ENTER] to confirm the combination.**
Play stops and "UTOC Writing" flashes on the display. When this stops flashing the track mark has been removed and the two tracks now are counted as one.

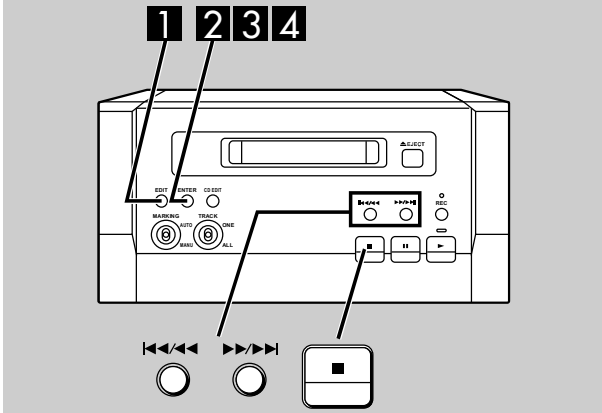
To cancel part way through
Press [¡].

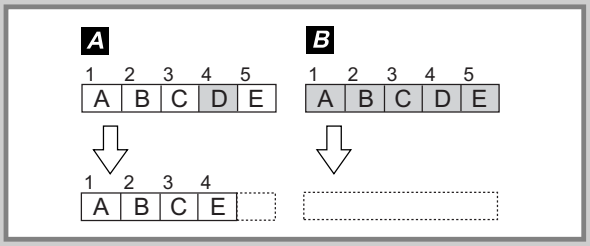
To divide the tracks again
Use DIVIDE.

Note

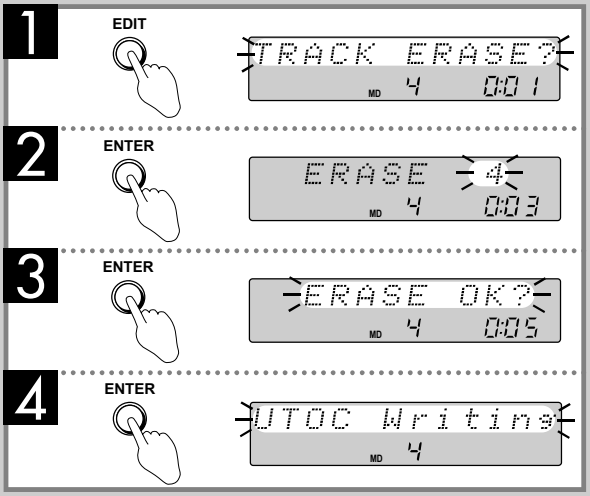
If you combined titled tracks, the combined track retains only the title of the first track.



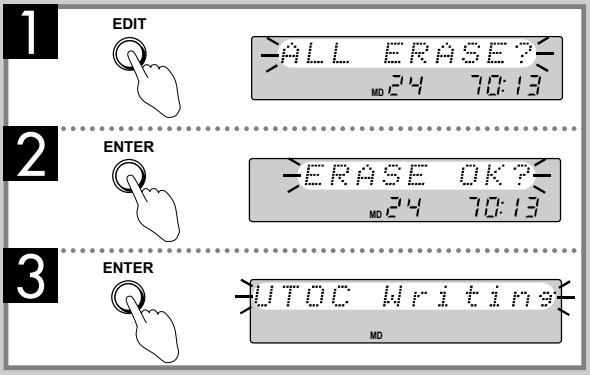




A



B



Erasing tracks and creating blank discs

A Erasing tracks

Unneeded tracks can be erased and the available recording time can be increased.
Make sure the disc is record enabled.

Play the track you want to erase, or select it with [⏮/◀◀] or [▶▶/▶▶⏭] while the player is stopped.

1 Press [EDIT] to select "TRACK ERASE ?".
Each time you press the button:
DIVIDE ? ¤MOVE ? ¤COMBINE ? ¤TRACK ERASE ? ¤ current display
"DIVIDE ?" is only displayed if the track is playing.

2 Press [ENTER].
The track number flashes on the display.
You can change the track to be erased at this stage by pressing [⏮/◀◀] or [▶▶/▶▶⏭].

3 Press [ENTER].
"ERASE OK ?" flashes on the display.
If you wish to cancel press [¡] now.

4 Press [ENTER] to erase the track.
Play stops and "UTOC Writing" flashes on the display. When this stops flashing the track has been erased. The tracks after it move back to fill the space so there is no missing track number after a track is erased.

To cancel part way through
Press [¡].

B Erasing a disc

This creates a blank disc.

Make sure the disc is record enabled.

While the disc is stopped

1 Press [EDIT].
"ALL ERASE ?" flashes on the display.

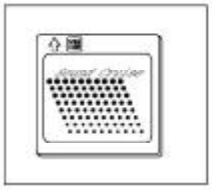
2 Press [ENTER].
"ERASE OK ?" flashes on the display.
If you wish to cancel press [¡] now.

3 Press [ENTER] to erase the disc.
"UTOC Writing" flashes on the display. When this stops flashing the disc has been erased and "BLANK DISC" is shown on the display.

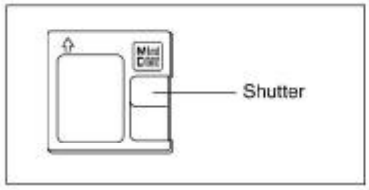
To cancel part way through
Press [¡].

Some useful information about MDs

Types of MDs



Prerecorded MDs
These discs are for playback only.



Recording MDs
Apart from the time limitations, it is possible to record up to 254 tracks on an MD.

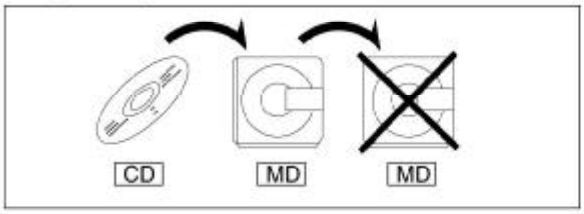
Recording on MDs

MDs are different to tapes

MDs give you control over how tracks are recorded and editing functions allow you to change the contents of an MD after recording.
Unlike cassettes, it is not necessary to find an empty portion to record onto. All recordings start from the first available space. The MD fills up and when the disc is full, either because the time limit has been reached or 254 tracks have been recorded, recording is no longer possible. You can use the editing functions to erase and move your recording around within the MD.

Limitations on digital recording

The serial copy management system (SCMS) prevents unlimited recording of digital material.
Digital recordings are of high quality, but to protect the rights of the producer of the original material, it is only possible to make one digital recording of a digital recording. This also applies if you record analog material digitally. That digital recording can be recorded digitally once more, but is blocked after that.
Analog recordings are otherwise unaffected.

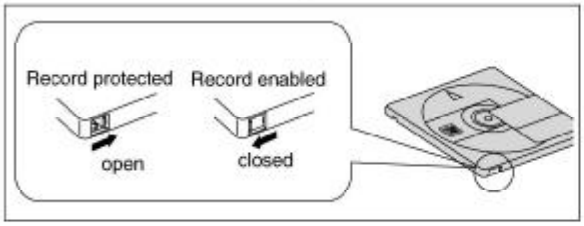


Stereo and monaural recording

This unit is capable of recording in stereo and can playback MDs recorded in stereo or monaural.
Monaural recording allows approximately twice the amount of material to be recorded and played back, but sound quality is affected.

Protecting your recordings

Move the switch to open the write protect hole. Close the hole when you want to record or edit the MD again.



Glossary of terms

Analog - This is the method that records and cassettes use to handle sound signals. It is possible to make analog recordings with MDs.

Digital - This is the usual method used by MDs and CDs to carry and record sound signals. Digital recording can be of very high quality.

Editing - This refers to any post-recording changes made to the MD.

Marking - This is the act of adding track marks. It can be done automatically when recording, or it can be done manually during recording or after recording with the editing functions.

TOC - Table of contents. Information stored on the MD about the tracks and times.

Track marks - These marks separate tracks. There can be up to 254 marks on one MD. They can be inserted automatically or manually during recording, and they can be added or removed with the editing functions after recording.

UTOC - User table of contents. This is information the user can edit, such as text and track positions.
The message "UTOC Writing" appears on the display after recording and editing.

Care and storage

Label MDs only as recommended. Extra labels and exposed adhesive can cause malfunctions.
Do not open the shutter, and close it immediately if it accidentally opens. Never touch the disc inside the MD cartridge.
Keep your MDs out of direct sunlight, humid and dusty places, and away from the direct heat of heating appliances.

■ Basic Knowledge of MD

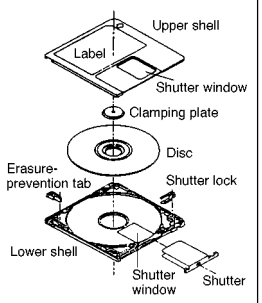
• Definition of an MD and the types of MDs

● What is an MD?	• "MD" stands for "mini disc". • Similar to a music CD, an MD is also a small disc capable of recording and playing back digital sound.
● Two types of MDs	• There are 2 types of MDs, a optical disc for playback-only MD and a magnet optic disc for recordable MD that is capable of both recording and playback.
● Playback-only MD is same as a CD.	• A playback-only MD is merely a smaller-diameter version of a CD. Just like a CD, the signals are read by light striking pits on the surface of the disc.
● Recordable MD uses magnet optic recording.	• With a magnet optic disc MD(Recordable MD) that is capable of both recording and playback, recording is performed by a vertical magnetization system in which a magnetic thin film on the surface of the disc is heated by a laser beam, and magnetism is applied in accordance with the data (audio signal) being recorded.
● Playback of a Recordable MD	• When a recordable MD is played back, a laser beam weaker than that used during recording strikes the disc and is reflected back, and the reflected light is twisted (polarized) in accordance with whether the magnetized direction is upward or downward, causing the reflected light to rotate very slightly clockwise or counterclockwise. Those subtle differences in the reflected light are picked up by two light-receiving elements and detected as either a "1" or a "0" by reading whether there is electrical current or no electrical current.
● 74-minute recording time	• If an MD were recorded in the same way as a CD, it would only have about 15 minutes of recording time. However, by using a new signal compression technology called ATRAC that was specifically developed for MDs, the signals are compressed to approximately one-fifth, making it possible to record for an extended time of 74 minutes, the same as with a CD. (Blank MDs are currently marketed in two recording times, 74 minutes and 60 minutes.)
● Can also be used on a computer.	• Although MDs were originally developed for use in recording and playing back music, in July 1993 the "MD data" standard was established. By using an MD data+music player, MDs can be used as external memory storage media for computers, and a single MD has a storage capacity of 140 MB, equivalent to about 100 floppy discs.

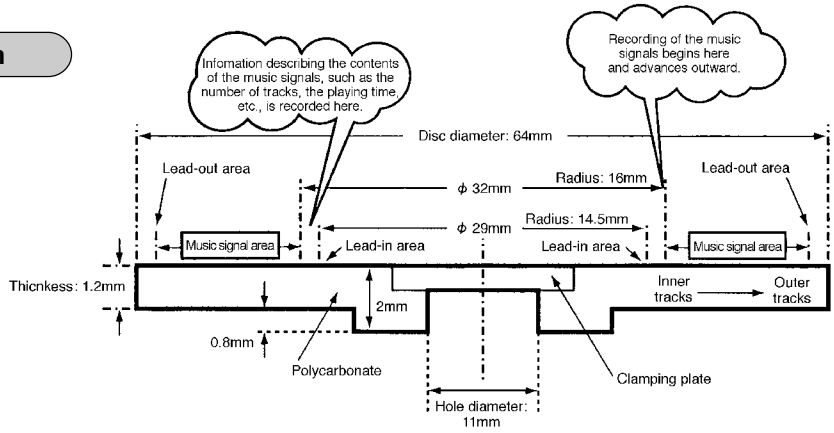
• Construction of an MD

● Construction of an MD	• The playback-only MD and the recordable MD are exactly identical in size and shape. • The figure below is a cross-sectional diagram of an MD disc. The diameter of an MD disc is 6.4 cm, approximately half that of a CD, and the thickness is 1.2 mm, the same as a CD. Similar to a CD, only one side of an MD disc is used to store data.
● Materials used in an MD	• The MD disc is made of polycarbonate, the same material that is used for a CD. Polycarbonate is a type of engineering plastic that is highly resistant to temperature and humidity, as well as having excellent wear and impact resistant. • A clamping plate is mounted in the center of the MD disc, and when the MD is loaded into a player, a magnet in the player attracts that metal plate to secure the disc in place. If the MD disc were to be secured by clamping it from above and below similar to a CD, it would be necessary to have a hole pass through the center of the MD cartridge, which would reduce the amount of space available for attaching a label. By using this magnetic method of securing the disc, the entire front side of the MD cartridge can be used as a label area. • Because of the metal plate mounted at the center of the MD disc, the center of the cartridge is 2 mm thick, slightly thicker than the rest of the cartridge. • To protect the MD disc from dust, fingerprints, and other things that might hinder the reading of the recorded signals, the disc is stored inside a cartridge similar to that of a floppy disc. When the MD is loaded into a player, the shutter on the cartridge is opened and the disc is ready to be played. • For a recordable MD, because there is no need for a recording head and it is only necessary for a laser beam to be directed at the underside of the disc, the shutter is located only on the back of the cartridge. • For a playback/record magnet optic disc MD, because it is necessary for the recording head and the laser beam to be able to access both sides of the disc, the shutter is located on both sides (upper shell and lower shell) of the cartridge.

Construction of magnet optic disc



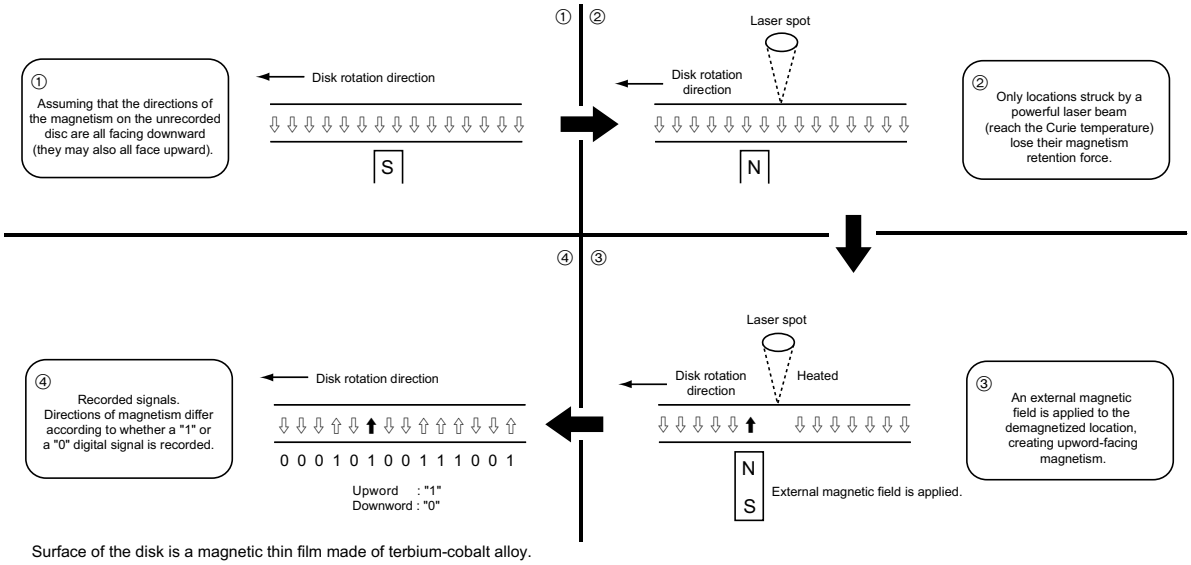
MD disc form



● Recording on a magnet optic disc

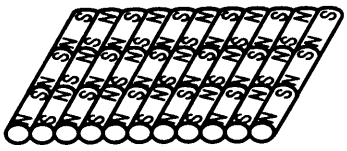
● Can be recorded and played back repeatedly.	• By using a magnet optic disc, digital signals can be recorded and played back over and over again.
● Recording principle	• To record on a magnet optic disc, a laser beams momentarily heats "pin spots" on the magnetic film on the back of the disc and a magnetic field is applied from the other side of the disc. Thus, both sides of the disc must be accessed in order to record. • To explain the recording principle, we will assume that the directions of the magnetism on an unrecorded disc are all facing downward (south-north = "0 0 0 0 ..."). (Actually on an unrecorded disc the directions are random.) • Thus, to record the signals "1 0 1 1 0 1 0", the direction of the magnetism at the locations where "1" is to be recorded must be changed to face upward (north-south). Because the magnetic film is strongly magnetic, once a downward-facing magnetism is recorded, it is not easy to change it to an upward-facing magnetism. • By directing a laser beam at the magnetic film, the temperature of the location that the laser beam strikes rises to the Curie temperature (recordable MD; about 180°C), eliminating the magnetic force (retention force). (Because the magnetic film is strongly magnetic, similar to a permanent magnet, once it is magnetized it has a strong retention force. In order to eliminate that retention force, it is irradiated with a laser beam so that the temperature rises to the Curie temperature.) • After the magnetism of the specific location is eliminated, an external magnetic field with an upward direction (north-south) is applied, thus changing the direction of the magnetism at that location to face upward (north-south). • Conversely, if a downward-facing (south-north) external magnetic field is applied, the direction of the magnetism at that location is changed to face downward (south-north). • Then, when the disc rotates and the location which has been changed to upward-facing magnetism leaves the laser spot, the temperature of the magnetic film drops, and the upward-facing magnetism recorded at that location is retained. • In this way, digital signals of "1" (upward-facing magnetism) and "0" (downward-facing magnetism) are recorded on the tracks on the disc.
● Vertical magnetization system	• With a conventional magnetic recording tape, the magnetic material is magnetized parallel (horizontal) to the surface of the tape. A magnet optic disc, however, uses a vertical magnetization system in which the magnetic poles are recorded perpendicular (vertical) to the disc surface. Because the magnetism is recorded vertically rather than horizontally, much more data can be recorded in a smaller area.
● Number of recordings possible	• A magnet optic disc can be recorded more than 1 million times, so it can virtually last forever.

Magnet optic disc recording principle

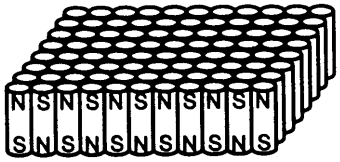

①
②
③
④
Laser spot
Disk rotation direction
Heated
① Assuming that the directions of the magnetism on the unrecorded disc are all facing downward (they may also all face upward).
② Only locations struck by a powerful laser beam (reach the Curie temperature) lose their magnetism retention force.
③ An external magnetic field is applied to the demagnetized location, creating upword-facing magnetism.
④ Recorded signals. Directions of magnetism differ according to whether a "1" or a "0" digital signal is recorded.
S
N
0 0 0 1 0 1 0 0 1 1 1 0 0 1
Upword : "1"
Downword : "0"
External magnetic field is applied.

Surface of the disk is a magnetic thin film made of terbium-cobalt alloy.

Horizontal magnetization



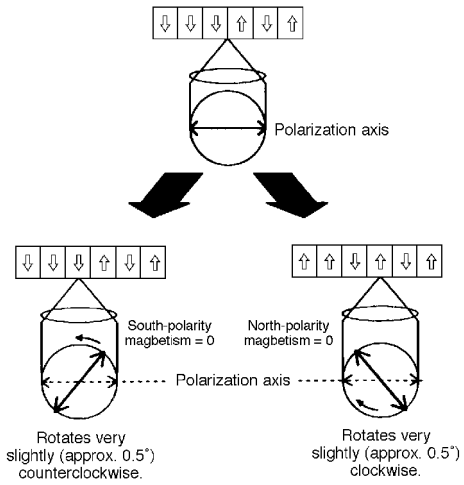
Vertical magnetization



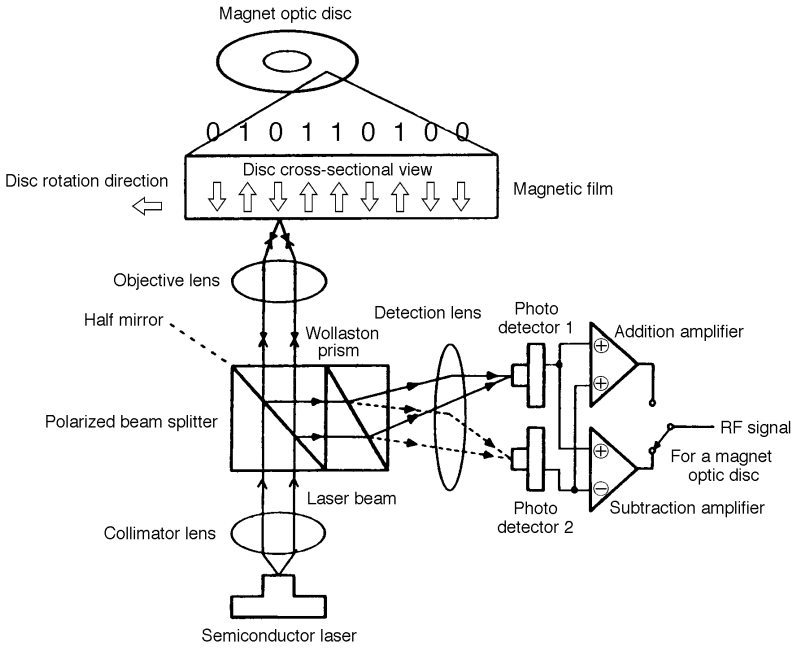
● Playback of a recordable MD

● Playback of a recordable MD	• Because the signals on a magnet optic disc are recorded vertically as north-south and south-north magnetism, the north and south magnetic poles appear on the surface of the disc's magnetic film. These signals are played back utilizing a phenomenon called the "Kerr effect" which occurs when a weak laser beam strikes the magnetic poles. • Light has wave vibration directions called "planes of polarization". ("Polarization" refers to a light wave which vibrates only in a fixed direction.) • With normal light, because the wave vibration directions are all mixed, no planes of polarization appear. • Because a laser beam is artificially generated light, it is possible to align the planes of polarization. • When a laser beam strikes something that has a magnetic field, the direction of the plane of polarization of the reflected light varies very slightly in accordance with whether the magnetism is north polarity or south polarity. When playing back a magnet optic disc MD, these slight changes in the direction of the plane of polarization are read.
● Reading of magnetic signals	• To further explain the principle used to read the signals recorded on a magnet optic disc, first a laser beam is directed at the disc. If the direction of the magnetism recorded on the disc is upward (north polarity), the plane of polarization of the light reflected from the disc rotates very slightly clockwise as a result of the Kerr effect. Conversely, if the direction of the magnetism is downward (south polarity), the plane of polarization rotates very slightly counterclockwise. • When the reflected laser light is passed through a Wollaston prism, the light is distributed to photo detector 1 if the direction of rotation is clockwise or to photo detector 2 if the direction of rotation is counterclockwise. • The light striking the two light receiving elements is converted into electrical current and a subtraction is performed. If the result of A-B is plus, a "1" is detected, and if the result of A-B is minus, a "0" is detected. • An MD player is compatible with both optical recording and magnetic recording, changing the reading system in accordance with the type of disc that is loaded.

Changes in the polarization axis due to the Kerr effect


Polarization axis
South-polarity magbetism = 0
North-polarity magbetism = 0
Polarization axis
Rotates very slightly (approx. 0.5˚) counterclockwise.
Rotates very slightly (approx. 0.5˚) clockwise.

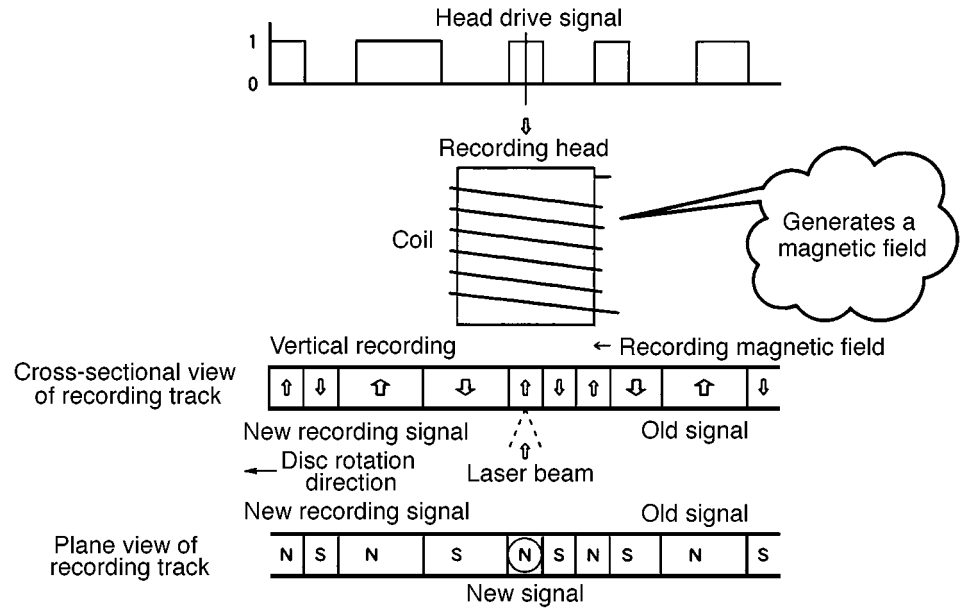
Playback of recordable MD



● Rewriting action of a magnet optic disc

● MD rewriting process	• The signals recorded on an MD are rewritten using a new process called “magnetic field modulation overwriting”*. • In this process, a laser beam spot of about 5 mW is focused on the location on the disc to be rewritten, heating that location to the Curie temperature (180°C) and thus canceling the magnetization. • At the same time, current flows to the optical pickup and to the magnetic head opposite it, between the two of which the disc is held, thus generating a magnetic field. • When the disc revolves so the laser spot moves from the location to be rewritten, the temperature drops below the Curie temperature and the magnetic field generated by the magnetic head re-magnetizes that location. • At this time, if the direction of the current flowing to the magnetic head is reversed in accordance with whether the data being recorded is “1” or “0”, the direction of the magnetic field also changes between north and south, and accordingly, the direction of the magnetization of the recording film changes between upward-facing and downward-facing. Thus, it is possible to directly magnetize the recording film on the disc in accordance with the “0” and “1” digital signals.
● No need for a erasing head	• Thus, the new recording data is overwritten regardless of the direction of the previously recorded magnetization, eliminating the need for an erasing head. • This process is called “magnetic field modulation overwriting”. • Because this “magnetic field modulation overwriting” makes it possible to directly overwrite the new signals on top of the old signals in a single process, re-recording on a MD is just as easy as with a magnetic tape, making the MD ideally suited for use in personal audio equipment.

Magnetic field modulation overwriting

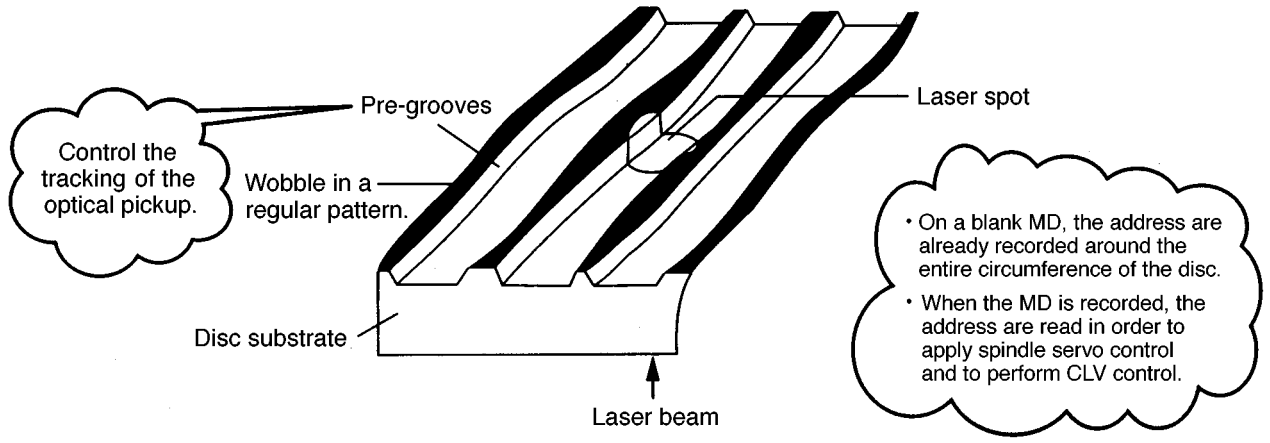


*Overwrite means to write new data while erasing the old data.

● Random access on a recordable MD

● Random access on a playback-only MD	• With a disc, high-speed random access is possible, something which is not possible with a tape. • The optical pickup moves quickly in the radial direction, thus directly accessing the start of each track. • With an optical disc, which is capable of playback only, the addresses in the TOC (table of contents) in the lead-in area are all read beforehand in order to access the start of each track.
● Random access on a recordable MD	• With a recordable MD, which is capable of both recording and playback, blank guide grooves, called “pre-grooves”, are formed around the entire surface of the disc at the production stage. • As shown in the illustration below, the pre-grooves wobble very slightly in a regular pattern, and that curve is fine-modulated (at intervals of 13.3 ms) to record beforehand the addresses of the continuous time data. • Technically speaking, the pre-grooves in the disc is not perfect spiral but is wobble with : – a typical amplitude of 30 nm. – a spatial period of 54 to 64 μm. When this wobble is locked to a frequency of 22.05 kHz, the velocity of the disc should be in the range of 1.2 to 1.4 m/s. • In this way, even if the MD is blank, because the addresses are already recorded around the entire circumference of the disc, when the MD is recorded, those addresses are read in order to control the movement of the optical pickup and perform CLV control. • To record immediately, quick access is first performed to quickly search for an blank area on the disc, and then recording will automatically begin. When recording is completed, that address is automatically recorded in the U-TOC (user table of contents) area, so it can be read during playback for quick and easy access. This also makes it easy to edit the track number.
● User TOC area	• Thus, with an MD, when the recording is completed, the track data is automatically written in the U-TOC area at the innermost part of the magnetooptic disc. The data is then read during playback for quick and easy access. • The addresses for the start locations of each track (track mark), and also the addresses for the end locations, are all recorded in the U-TOC, so when editing a track all that has to be rewritten is the area address. • This is similar to the directory that a computer writes on a floppy disk.

Pre-grooves on a magnet optic disc


Control the tracking of the optical pickup.
Pre-grooves
Wobble in a regular pattern.
Laser spot
Disc substrate
Laser beam
• On a blank MD, the address are already recorded around the entire circumference of the disc.
• When the MD is recorded, the address are read in order to apply spindle servo control and to perform CLV control.

*Spindle servo control means control of the disc’s rotation speed.

● ATRAC signal compression technology

● What does the word ATRAC mean?	• "ATRAC" (adaptive transform acoustic coding) is the name given to the signal compression technology that is one of the most important technologies used in the MD system. The principles of this technology are extremely complex, so here we will only explain the basic concept. • Simply speaking, utilizing the characteristics of the human auditory sense, the sounds that cannot be heard by the human ear are eliminated so that only the sounds that can be heard remain, thus reducing the amount of data that must be recorded. This principle is similar to the PASC signal compression that is used for digital compact discs.
● Why is signal compression necessary?	• The amount of data that can be recorded per second (the bit rate) is 16 bits x 44,100 x 2 channels = 1,411,200 bits per second, or approximately 1.4 megabits per second (1 megabit = 1,000 kilobits = 1 million bits). • However, because the diameter of an MD is only about one-half that of a CD, it only has a capacity of about 160 megabytes. In order to record the same 74 minutes of data as a CD, the bit rate of 1.4 megabits per second must be compressed to one-fifth. "ATRAC" is the signal compression technology that was developed in order to do that. (Signal compression is rather like the technology for orange juice concentrate, in which the best part of the fresh orange is concentrated for easy transportation and then reconstituted with water before drinking.)
● Basic concept of ATRAC	• The basic concept of ATRAC utilizes the characteristics of the human auditory sense. The frequency spectrum that cannot be heard by the human ear (Fig. B) and the frequency spectrum that cannot be heard because it is masked by high-level sounds (Fig. C) are cut, and the bit rate is compressed by appropriately arranging the bits, thus making it possible to fit all of the necessary data within the capacity of the disc. •Technically speaking, the analog signals are converted to 44.1-kHz 16-bit digital signals, and these signals are then processed by the ATRAC encoder. Using a maximum time of 11.6 ms as a single unit, the encoder converts the digital waveforms within each single unit into about 500 different frequency spectra and then analyzes the strength level of each frequency. Then, as shown in the figures below, utilizing the two principles of the "threshold of audibility" and the "masking effect", only the signals actually heard by the human ear are selected and compressed to one-fifth the original volume. •This complex process is performed by an LSI chip called the ATRAC.

Threshold of audibility

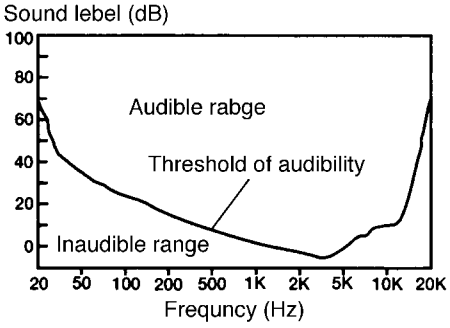


Fig.A

Signals below the threshold of audibility are eliminated

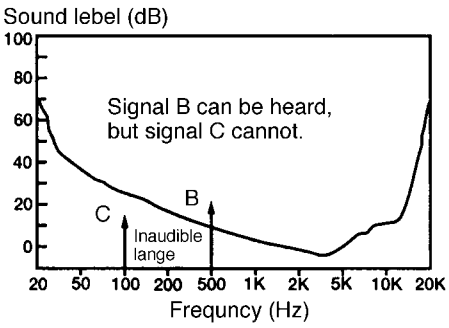


Fig.B

Masking by high-level sounds

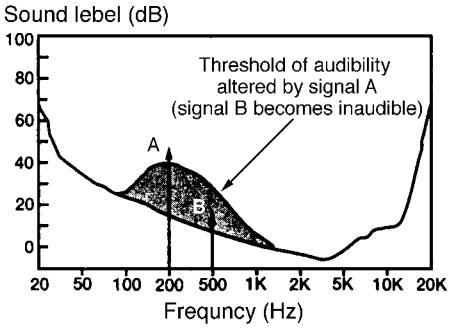
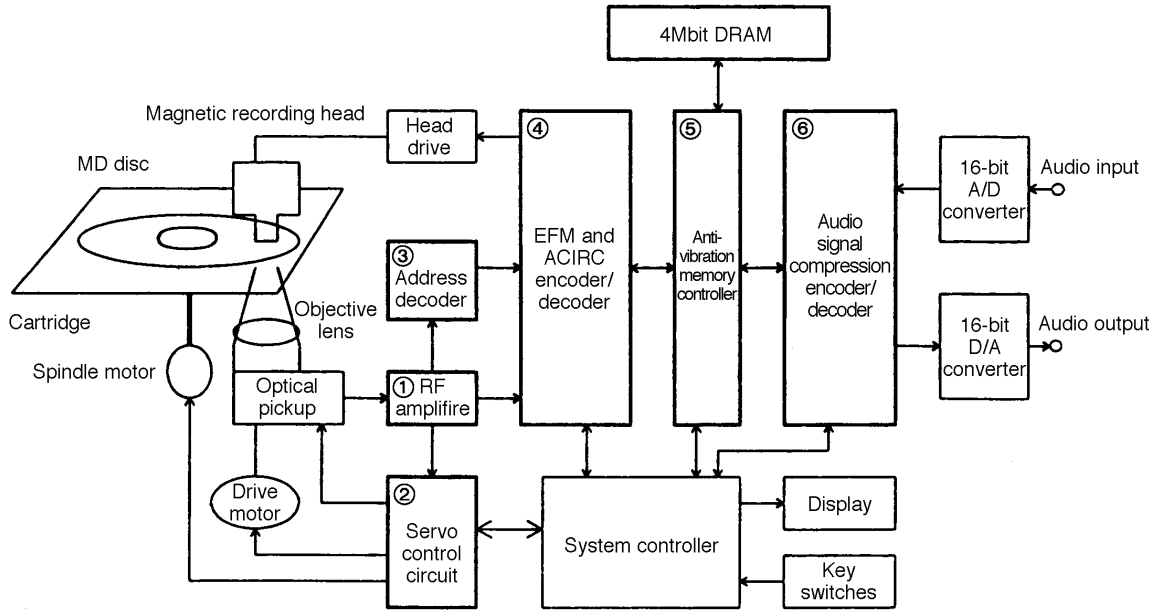


Fig.C

● Composition of an MD system

● Development of 6 LSIs	• The figure below shows the composition of an MD system. An MD system uses six LSIs that were specifically developed for MD. The following is a description of the functions of those six LSIs.
① RF amplifier	• This LSI controls the laser and performs the detection processing of the servo signals and of the audio signals from the disc needed to correct the position of the laser spot.
② Servo control circuit	• This LSI receives the laser spot position correction signals from the RF amplifier and controls the focus servo that ensures that the laser spot is correctly focused on the disc surface and the tracking servo that controls the disc rotation direction to ensure that the pits on the disc surface are traced correctly.
③ Address decoder	• This LSI demodulates the address signals that are recorded in the pre-group on a playback/record magnetooptic disc MD. In addition to reading the absolute addresses, the address decoder also functions to control the rotation speed so that the servo signal is obtained at a constant linear speed at the location being read.
④ EFM and ACIRC encoder/ decoder	• This is the main signal processing LSI. EFM is a circuit which converts 8-bit digital signals into the 14-bit format recorded on the disc. It also performs signal processing for error correction, changing the interleaving format in order to use the ideal algorithm for MD. In addition, this LSI also performs other tasks such as encoding during recording and decoding during playback.
⑤ Anti-vibration memory controller	• This memory controller provides a "shock-proof" memory.
⑥ Audio signal compression encoder/decoder	• This LSI performs the signal processing for the ATRAC compression technology that was specifically developed for MD.
● New generation LSIs	• New genaration LSIs developed for higher performance of MD system. There are reduced to three LSIs. 1. RF amplifire 2. 4 ch driver (servo control) 3. Signal processor

Block Diagram for playback/record MD circuit



When replacing the LED base plate, be sure to replace L and R sides simultaneously to permit the brightness adjustment.

***For configuration at the time of supply of replacement parts,refer to "Printed Circuit Board Diagram."**

2. Before Repair

This equipment (SJ-HD505),which is a component of this system,is supplied with power from the amplifier (SE-HD505MD) through the tuner (ST-HD505MD). When repairing this equipment or checking operation of the system, be sure to connect the amplifier and tuner with it.
This equipment, even in the state of it as a single equipment, permits power supply and operation check. When operating it as a single equipment without the amplifier and tuner, refer to the paragraph of "Measurements and Adjustments.

3. Precaution of Laser Diode

CAUTION:

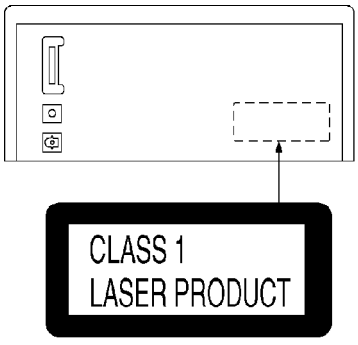
This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted fromthe pickup lens.
Wave length:780 nm
Maximum output radiation power from pickup: 100 μ W/VDE
Laser radiation from the pickup lens is safety level,but be sure the followings:

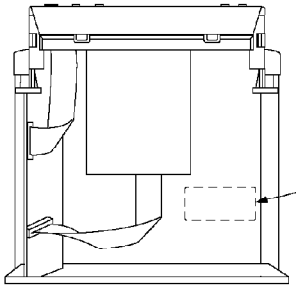
1. Do not disassemble the optical pickup unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pickup unit. It was already adjsuted.
3. Do not look at the focus lens using optical insturments.
4. Recommend no to look at pickup lens for a long time.

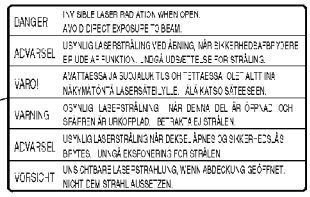
ACHTUNG:

Dieses Produkt enthält eine Laserdiode. Im eingeschalteten Zustand wird unsichtbare Leserstrahlung von der
Laserinheit adgestrahit.
Wellenlänge: 780 nm
Maximale Strahlungsleistung der Lasereinheit: 100 μ W/VDE
Die Strahlungan der Lasereinheit ungefährlich, wenn folgende Punkte beachtet werden:

1. Die Lasereinheit nicht zerlegen, da die Strahlung an der freigelegten Laserdiode gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinhit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.







LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

CAUTION!
THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

4. Operating Instructions

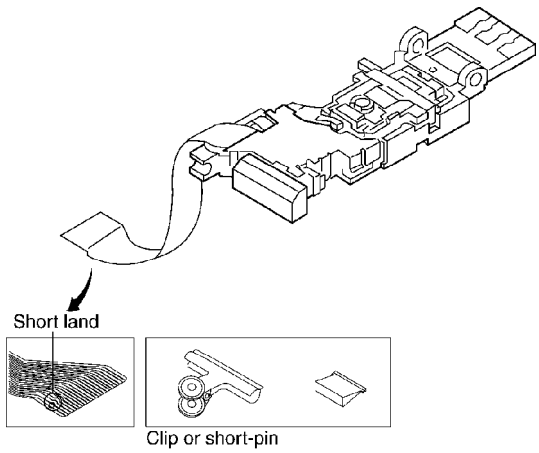
5. Handling Precautions for Traverse Deck (MD Unit)

The laser diode in the MD unit (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.So, be careful of electrostatic breakdown during repair of the MD unit (optical pickup).

5.1. Handling of MD Unit (optical pickup)

1. Do not subject the MD unit (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. The short land between the No. 25 (LD-GND) and No. 24 (LD) pins on the flexible board is shorted with a solder build-up to prevent damage to the laser diode. (As shown in Fig. 1.)
   To connect to the PC board, be sure to open by removing the solder build-up, and finish the work quickly.
3. Take care not to apply excessive stress to the flexible board (FFC).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

Fig. 1



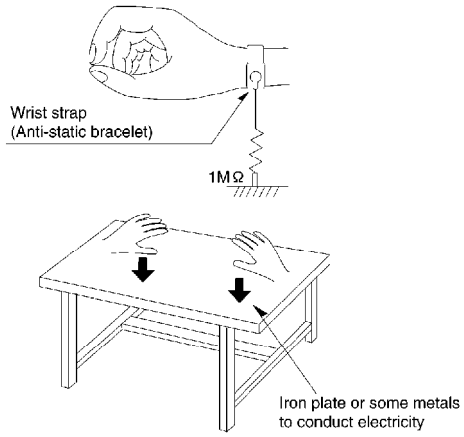
5.2. Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body. (As shown in Fig. 2.)
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).

Fig. 2



6. Operation Checks and Main Component Replacement Procedures

NOTE **1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**

2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.

3. Select item from the following index when checks or replacement are required.

• Contents

■ Checking Procedures for each P.C.B.

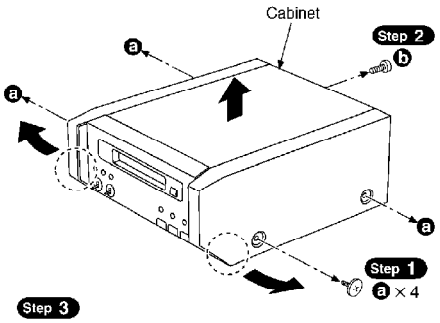
1. Checking for the main P.C.B..
2. Checking for the MD servo P.C.B..

■ Main Component Replacement Procedures

1. Replacement for the magnetic head and optical pickup ass'y.
2. Replacement for the belt and loading motor ass'y.
3. Replacement for the traverse motor ass'y.

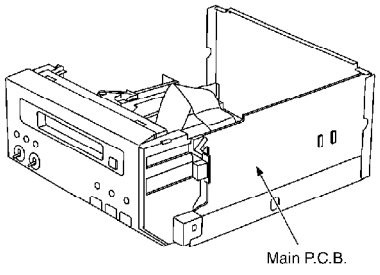
■ Checking Procedures for each P.C.B.

1. Checking for the main P.C.B.



Spreading the both front tails indicated with (◌) of cabinet a small amount, lift up and remove the cabinet in the direction of arrow.

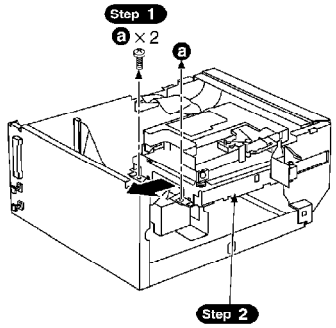
· Check the main P.C.B. as shown below.



2. Checking for the MD servo P.C.B.

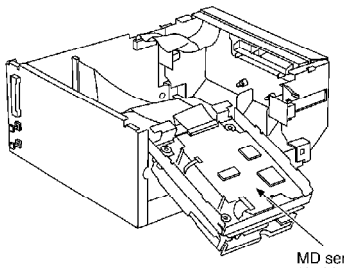
· Follow the Step 1 ~ Step 3 of the item 1 in checking procedure for each P.C.B..

〈Checking for the MD servo P.C.B. (A side)〉



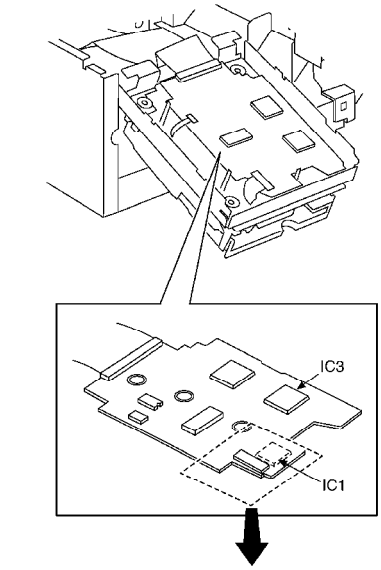
Remove the MD mechanism unit in the direction of arrow.

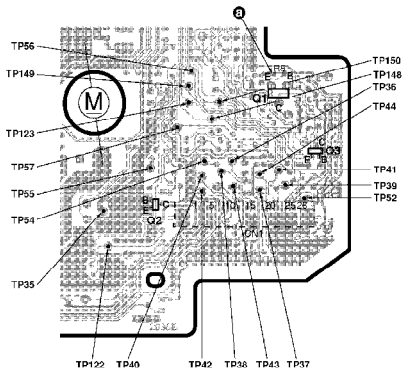
· Check the MD servo P.C.B. (A side) as shown below.



〈Checking for the MD servo P.C.B. (B side)〉

· When checking the IC1 on the of MD servo P.C.B. (B side), it can be measured with test point on the MD servo P.C.B. (A side).





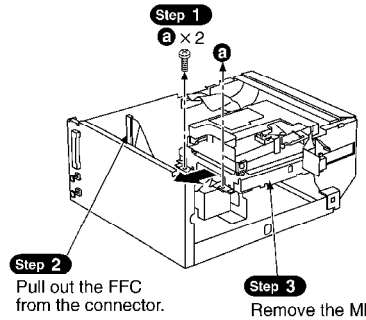
Pin No. of IC1	Test point	Pin No. of IC1	Test point
2PIN	Left side of R8 (ⓐ)	32PIN	TP52
		36PIN	Equivalent for pin 16 of IC3
5PIN	TP54		
11PIN	TP55	37PIN	TP35
16PIN	TP57	38PIN	TP44
21PIN	TP56	39PIN	TP37
26PIN	TP36	40PIN	TP38
27PIN	TP150	41PIN	TP43
28PIN	TP149	44PIN	TP42
29PIN	TP148	45PIN	TP40
30PIN	TP123	46PIN	TP39
31PIN	TP122	47PIN	TP41

(The waveforms are noted on the schematic diagram.)

■ Main Component Replacement Procedures

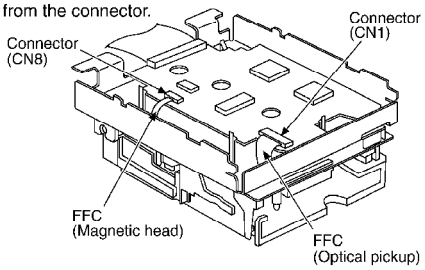
1. Replacement for the magnetic head and optical pickup

· Follow the Step 1 ~ Step 3 of the item 1 in checking procedure for each P.C.B..



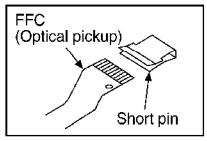
Step 4

Remove the 2 FFCs from the connector.



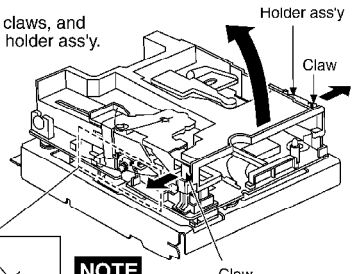
NOTE

Insert a short pin into the traverse unit FFC borad. (Refer to "Handling Precautions for Traverse deck".)



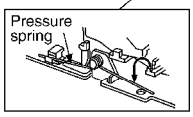
Step 6

Release the 2 claws, and then lift up the holder ass'y.



Step 5

Remove the pressure spring from latch.

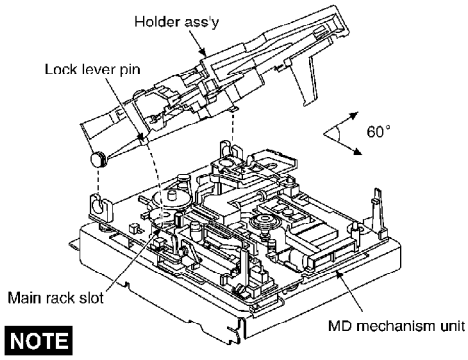


NOTE

When installing the holder ass'y, the pressure spring should be latched correctly.

Step 7

Set the holder ass'y and MD mechanism unit at a 60 degree angle, and then pull out the holder ass'y.



NOTE

When installing the holder ass'y, align the lock lever pin with the main rack slot.

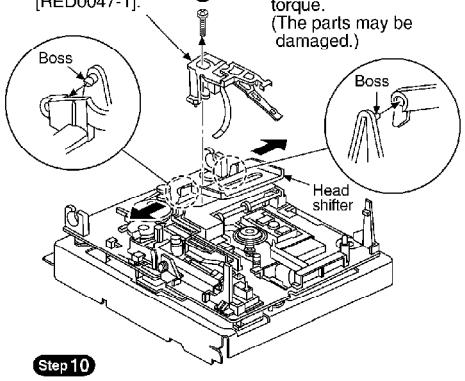
NOTE

1. Take care not to damage the magnetic head.
2. Do not tighten the set screw (ⓑ) in excessive torque. (The parts may be damaged.)

Step 9

Remove the magnetic head [RED0047-1].

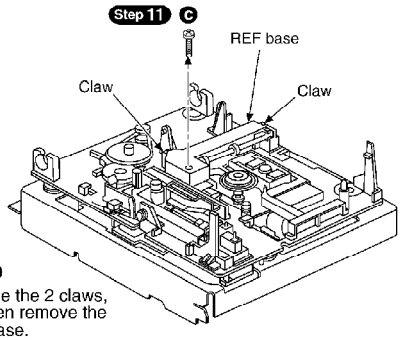
Step 8 ⓑ



Step 10

Spread the lugs of head shifter, and then release the lugs from boss.

Step 11 ⓒ



Step 12

Release the 2 claws, and then remove the REF base.

Step 13

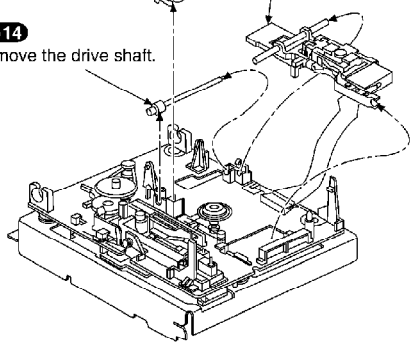
Remove the thrust spring.

Step 15

Remove the optical pickup ass'y.

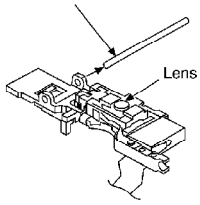
Step 14

Remove the drive shaft.



Step 16

Pull out the main shaft.



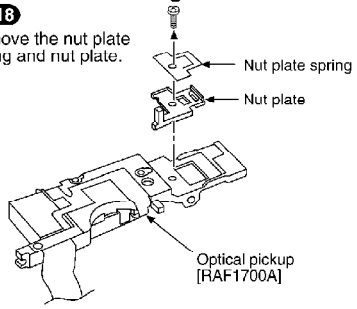
NOTE

1. Use care to prevent damage the optical pickup, due to the precision construction.
2. Do not apply the grease on the lens of optical pickup.
3. Do not touch the lens of the optical pickup.

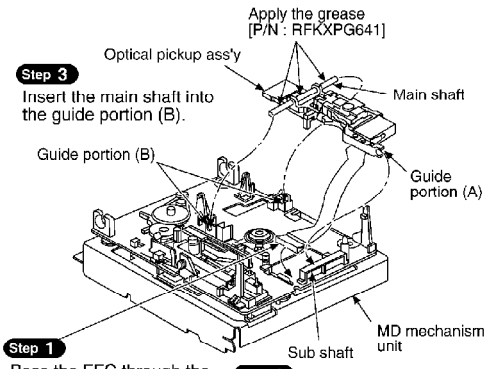
Step 17 ⓓ

Step 18

Remove the nut plate spring and nut plate.

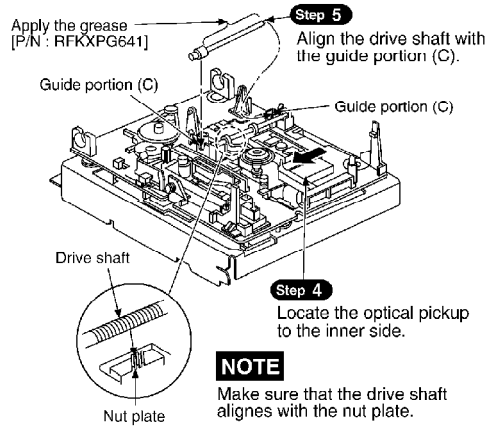


Notice for installing the optical pickup


Apply the grease
[P/N : RFKXPG641]
Optical pickup ass'y
Step 3
Insert the main shaft into the guide portion (B).
Main shaft
Guide portion (B)
Guide portion (A)
MD mechanism unit
Sub shaft
Step 1
Pass the FFC through the slot of MD mechanism unit.
Step 2
Align the guide portion (A) of optical pickup with the sub shaft.

NOTE

Take care not to bend the FFC.

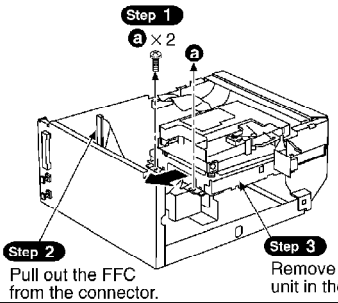


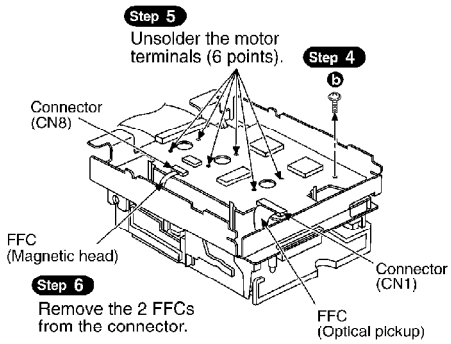
NOTE

Make sure that the drive shaft alignes with the nut plate.

2. Replacement for the belt and loading motor ass'y

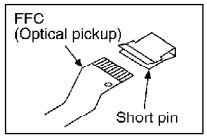
· Follow the Step 1 ~ Step 3 of the item 1 in checking procedure for each P.C.B..

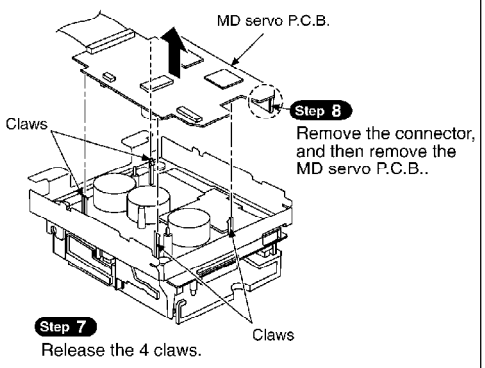


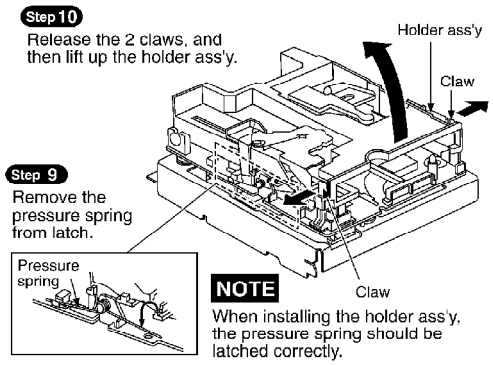


NOTE

Insert a short pin into the traverse unit FFC borad.
(Refer to "Handling Precautions for Traverse deck".)





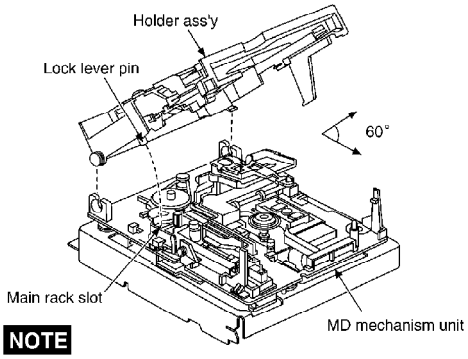


NOTE

When installing the holder ass'y, the pressure spring should be latched correctly.

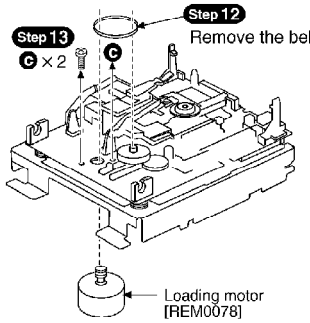
Step 11

Set the holder ass'y and MD mechanism unit at a 60 degree angle, and then pull out the holder ass'y.

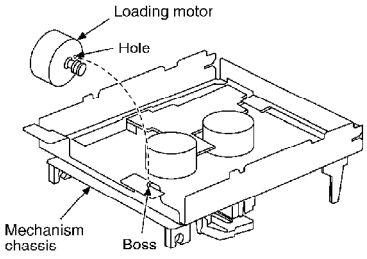


NOTE

When installing the holder ass'y, align the lock lever pin with the main rack slot.



Notice for installing the loading motor



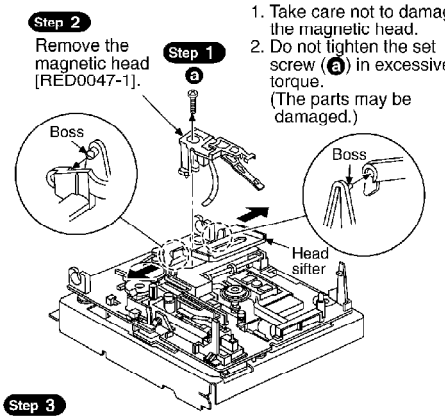
- Align the hole of loading motor with the boss of mechanism chassis, and then install the loading motor.

3. Replacement for the traverse motor ass'y

- Follow the **Step 1** ~ **Step 3** of the item 1 in checking procedure for each P.C.B..
- Follow the **Step 1** ~ **Step 11** of the item 2 in main component replacement procedures.

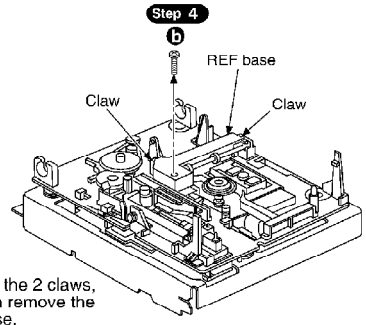
NOTE

1. Take care not to damage the magnetic head.
2. Do not tighten the set screw (a) in excessive torque. (The parts may be damaged.)



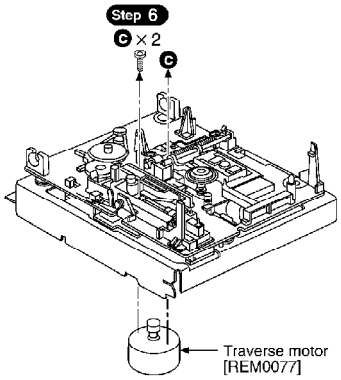
Step 3

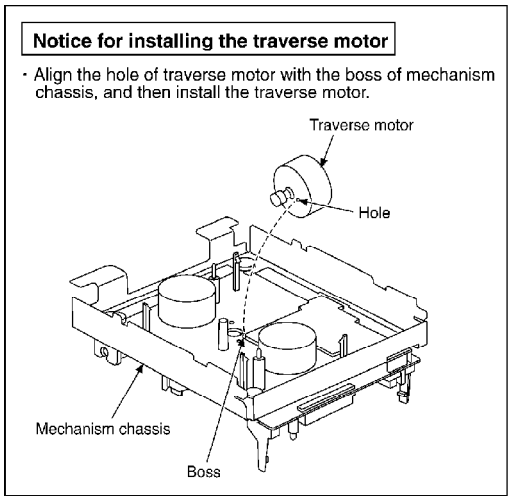
Spread the lugs of head shifter, and then release the lugs from boss.



Step 5

Release the 2 claws, and then remove the REF base.




Notice for installing the traverse motor
・Align the hole of traverse motor with the boss of mechanism chassis, and then install the traverse motor.
Traverse motor
Hole
Mechanism chassis
Boss

7. Basic Knowledge of MD

8. Operating Procedures

8.1. Operating Procedures

Play

1. To read the signals recorded on the disc, the laser beam emitted by the laser diode (LD) strikes the disc and is reflected back and

detected by the photodetector (PD).

- **For a pre-mastered disc, similar to a CD, the signals are recorded as pits on the surface of the disc, and the signals are detected by the amount of light reflected when the laser beams strikes the pits.**
- **For a recordable disc, the signals are recorded by magnetizing the magnetic film on the surface of the disc and there is no variation in the amount of light that is reflected, so the signals are detected using the shifting of the polarization of the reflected light due to the Kerr effect (*1).**

2. **The detected signals are input to pins 38 and 39 of the RF IC (IC1), where they are amplified and then output from pin 32.**

   - **By observing the input signals (between pins 38 and 39) and the output signals (pin 32) on an oscilloscope, it is possible to check the eye pattern.**

3. **Error correction of the amplified signals is performed by the MD LSI (IC3:MN66616RA1) using EFM demodulation and ACIRC (*2) and the signals are stored in the DRAM (IC72:MNV4400-T8T). At this time, the cycle of the signals is adjusted by the LSI's clock in order to eliminate any jitter that might result from irregular revolution of the disc.**
4. **The signals are sequentially taken from DRAM (IC72) and send back to MD LSI (IC3), where they are ATRAC (*3)-decorded, exchange it for analog signal by using AD-DA CONVERTER LSI (IC4:AK4518VF-E2), and output from pins 19 (left channel) and 20 (right channel).**
5. **The digital signals output from the MD LSI are input to pin 15 of the A/D-D/A CONVERTER (IC4:AK4518VF-E2), where they are converted to analog signals and then output from pins 19 (left chabbel) and 20 (right channel).**
6. **The analog-converted signals are output to LINE OUT.**

   - **The exchange of signals between the DRAM and the MD LSI is performed using four data lines (pins 1, 2, 24, and 25 of the**

DRAM and pins 43, 44, 45, and 46 of the MD LSI.

Record

1. The signals input from OPTICAL IN are input to pins 70 and 71 of the MD LSI (IC3) via the buffer amp IC(IC401; input: pin 4,6 output: pin 3,5)
2. The signals input to pins 70 and 71 of the MD LSI (IC3) are converted to a sampling frequency of fs = 44.1 kHz by an fs converter inside the LSI. If the signals are already fs = 44.1 kHz, they bypass the fs conveter.
3. The signals converted to fs = 44.1 kHz or the signals input to pin 65 are ATRAC-encoded and stored in the DRAM (IC72).
4. The signals are sequentially taken from the DRAM (IC72) and sent back to the MD LSI (IC3), where they are ACIRC-processed and EFM-modulated and then output from pin 73 to the magnetic head.
5. The magnetic disc records the signals onto the disc by magnetizing the magnetic film on the surface of the disc. During recording the laser diode emits its laser beam in order to raise the temperature to the Curie temperature (*4) that is required to magnetize the magnetic film. For this reason, the optical power of the laser diode is higher during recording than during playback..

    - Although the disc revolves at a speed fast enough to write the signals without compression,the recording signals are compressed in order to reduce the data volume. As a result, the signals are written intermittently rather than continuously (the recording signals are intermittently sent to the magnetic head).

Control

1. performs the necessary controls for each operation during playback and recording and for writting og the UTOC*5 at the end of recording.

    - The information written in the UTOC includes the recorded track numbers and their addresses, text data, etc..

Clock

- The controls of the playback signal, recording signals, and of the 4-channel driver IC (IC1: AN8772) all function using the clock on the MD LSI as the master clock.

***1 Kerr effect**

A phenomenon in which the polarization plane of laser light reflected from a material shifts in one of two directions depending upon its “plus” or “minus” magnetic polarization.

***2 ACIRC ..... Add on interleave CIRC**

The aim of Add-on interleave is to improve the resistivity in CD-ROM decoder from the burst error on the disc.

***3 ATRAC ..... Adaptive Transform Acoustic Cording**

The digital data compressing system developed for MiniDisc in which audio signals can be reproduced with only about 1/5th in the data normally required for high fidelity reproduction.

***4 Curie temperature**

The temperature at which magnetism of a specific material dissipates. This temperature varies according to the material.

***5 UTOC.....User Table Of Contents**

Found only on recordable MiniDiscs, this area contains subdata (track number, etc.) which can be rewritten by the user.

9. Measurements and Adjsutments

Cautions:

- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.) With the unit turned "ON" , laser radiation is emitted from the pickup lens.

This unit SJ-HD505 is designed to operate on power supplied from the Amplifier SE-HD505MD through the Tuner ST-HD505MD.When connecting the unit to other system components, do not connect to the Amplifier SE-HD505MD directly. Be sure to connect this unit through the Tuner ST-HD505MD.When operating the unit SL-HD505 alone for testing and servicing, without having power supplied from the Amplifier SE-HD505MD, use the following method.

9.1. Power Supply to This Unit alone

1. Setting of the unit switches: Set MARKING to "AUTO", and

TRACK to "ONE". (Refer to Fig.3.)

2. As shown in Fig.4, short-circuit the no. 8 pin (TP77) of IC10 and GND (TP74) with the lead wire. (This enables the unit to enter the operation mode and to activate the operation switches on the front panel.)
3. Apply DC 10 V between the no. 5 pin (+10 V) and no. 11 pin (GND) of the CP304 (connector) as shown in Fig.5. ("REC" and "▶" will light up. "▶" is orange color.)

9.2. Preparing Play/Rec. Cheking

Connect the oscilloscope or the speaker with built-in amplifier to the section between CP304-12pin[LINE OUT(Rch)] and 17pin(A.GND) as well as the section between CP304-14pin[LINE OUT(Lch)] and 17pin(A.GND) and check if the signals are outputting from this unit. (As shown in Fig.5.)

Fig.3

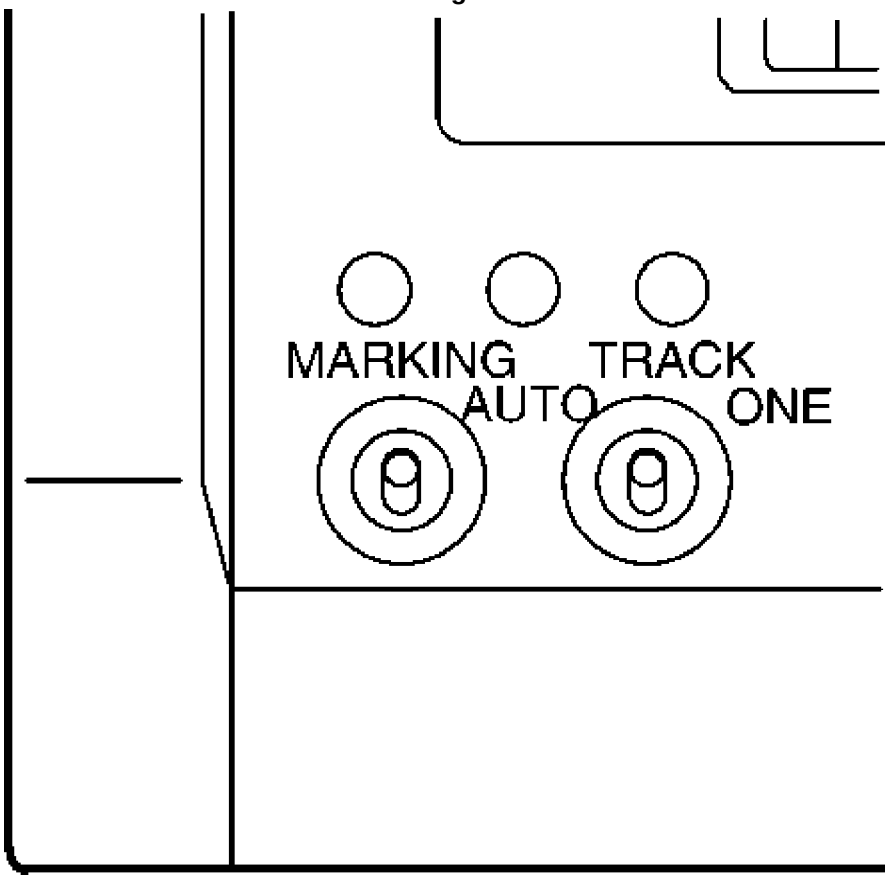


Fig.4

< MD SERVO P.C.B. (SIDE: A) >

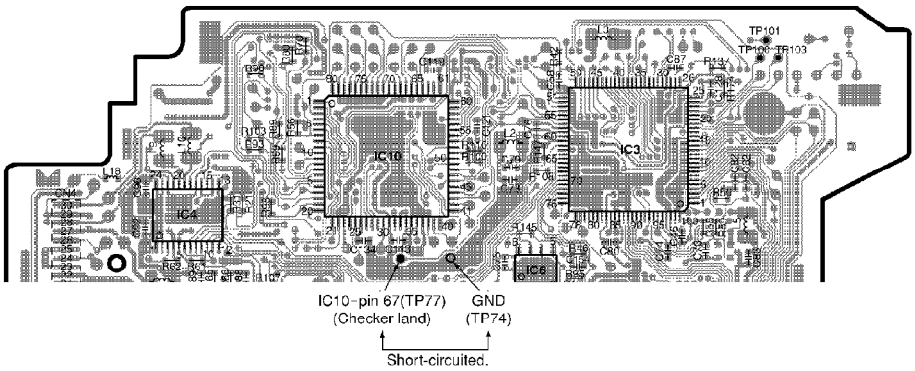
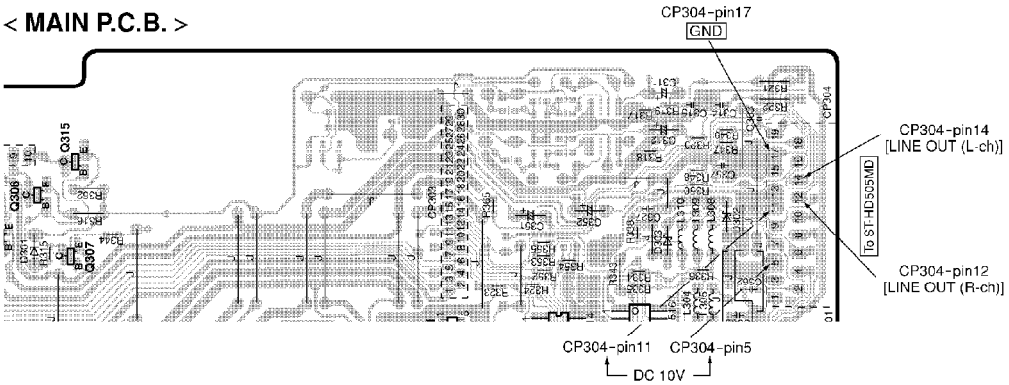


Fig.5

< MAIN P.C.B. >



9.3. How to Check Play/Rec. Signal to This Unit alone

Necessary instruments:

- **Recorded MD**
- **Recordable MD**
- **Optical cable**
- **Portable CD player and CD**

(You can check this operation with any player that has an optical digital output terminal other than the portable CD player. The following procedure explains check operation with the portable CD player, but the procedure is the same for the other players.)

Procedure:

1. **Set the unit so that “Power Supply to This Unit alone” as previously explained.**
2. **Preparing of PLAY/REC. check.**
   Playback check
3. **Set the recorded MD in the unit.**
4. **Press the ▶ button and check if the MD play backs. (As shown in Fig.6, when the ▶ button is pressed, the LED turns green.)**

5. Remove the MD after check. (Recording check)
   Recording check
6. Connect the portable CD player (or any player with an optical digital output terminal) with the unit (CD side of the optical digital input terminal). (Refer to Fig.7.)
7. Set the recordable MD.
8. Press the REC button. The REC LED (red color) blinks. (Refer to Fig.6.)
9. Play back the CD and press the ▶ button. The recording starts. (Refer to Fig.6.)
10. Press the ■ button. (UTOC will be written.) (Refer to Fig.6.)
11. Play back the MD and check if the MD is recorded.
12. Remove the MD after check.
13. Turns off the power, and remove the lead wire between the no. 8 pin (TP77) of IC10 and GND (TP74). (Refer to “Power Supply to This Unit alone.”)

Fig.6

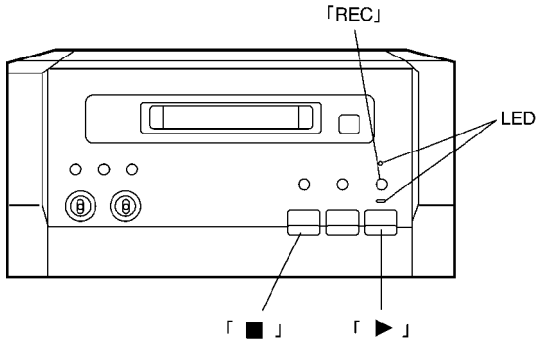
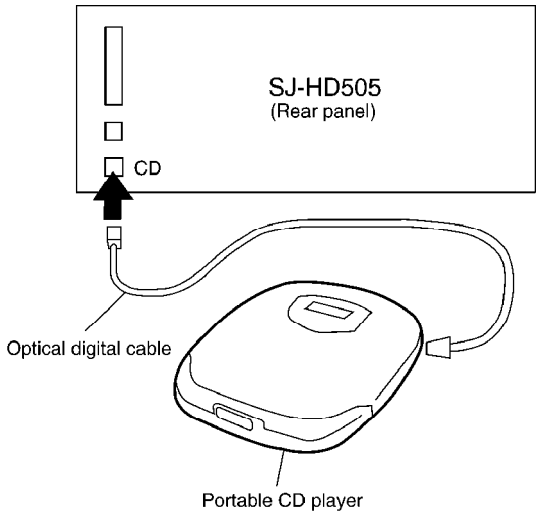


Fig.7



9.4. Laser Power Adjustment

Adjust each laser power: read power for reading (play) and write power for writing (record).

9.4.1. Necessary Instruments

- Laser power meter (Advantest TQ8210 or compatible meter)
- Test disc (Pre-mastered disc RFKV0006 or RFKV0014)
- Recordable disc available on sales root (with music recorded)
- Insulated driver for adjustment such as a ceramic driver
- Jitter meter

9.4.2. Set the Unit to the Adjustment Mode

1. Perform the item of “MD servo board check” in “Operation Checks and Component Replacement Procedures”, step 1 and 2.

Cautions

1. About handling the MD unit

   - The magnetic head is a precision unit and is very fragile. Do not deform it.
   - Laser diode in the optical pickup may be destroyed by the staticelectricity generated in your clothes or body. Be especially careful with the static electricity.
   - The optical pickup is structured extremely precisely. Do not subject to the strong impact or shock. Do not touch the lens.

2. About handling the magnetic head
   When replacing the magnetic head, do not tighten the mounting screw (RHD17022) too firmly. If the screw is tightened too much to deform the resin, the position of the head is moved, and this

affects its recording operation.
Recommended torque for mounting screw: 700 g cm +/- 100 g cm
Reference: This is the same force as using a screwdriver with a 15 -mm diameter grip, you fasten the screw naturally with your thumb and index finger.

3. About the driver for adjusting laser power
   Use only insulated driver such as a ceramic driver. With the metal driver, it is not possible to adjust properly because of the induction noise. Also, if it short-circuits with the chassis, it may destroy or damage the laser diode.
   Recommended driver: VESSEL 9000 1.8 -30 (Ceramic driver)

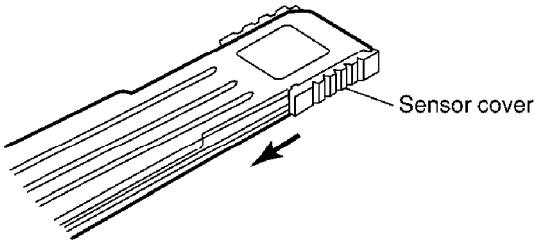
Cautions on optical pickup:

- The optical pickup and the magnetic head are structured precisely; therefore, they are very fragile. Be careful not to touch them with the edge of the laser power meter.
- The sensor of the laser power meter is a very fine part. Be careful not to touch it to the optical pickup lens.
- The focus point of the laser reaches to 356°F. Therefore, avoid adjusting using laser power for a long time because the sensor of the laser power meter may be burned.
- Do not allow the write power to even momentarily reach or exceed 7.5 mW. Doing so will result in damage to the optical pickup.
- Do not set the unit to the laser power adjustment mode with the MD loaded. Doing so may result in damage to the MD.

9.4.3. Adjustment Procedure

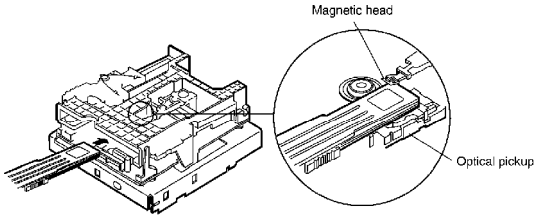
1. Remove the MD unit from the system unit.
2. Short-circuit the no.8 pin (TP77) of the IC10 and GND (TP74) with the lead wire.
3. Set the MD unit in the system unit and turn on the power. The REC and PLAY of the main unit will light up.
4. Slide the sensor cover of the laser power meter. (Refer to Fig.8.)

Fig.8



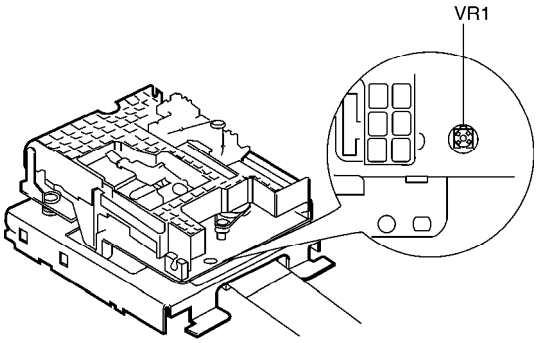
5. Position the sensor of the laser power meter directly above the optical pickup. (Refer to Fig.9.)

Fig.9



6. Press the CD EDIT button and confirm that the reading of the laser power meter is within the specified range. If it is higher than 680 uW, adjust by turning VR1 and set to lower than 680 uW. (Refer to Fig.10.)

Fig.10



Specified range (read power): 680 uW or lower

Caution:

- Proceeding on to the subsequent adjustment procedure with the read power exceeding 680 uW will result in damage to the optical pickup.

7. Press the CD EDIT button and read the write power. Specified range (write power): 6.8 mW +/-0.1 mW

8. If it is not within 6.8 mW +/-0.1 mW, adjust by turning VR1. (Refer to Fig.10.)

Caution:

- Do not allow the write power to even momentarily reach or exceed

7.5 mW. Doing so will result in damage to the optical pickup.

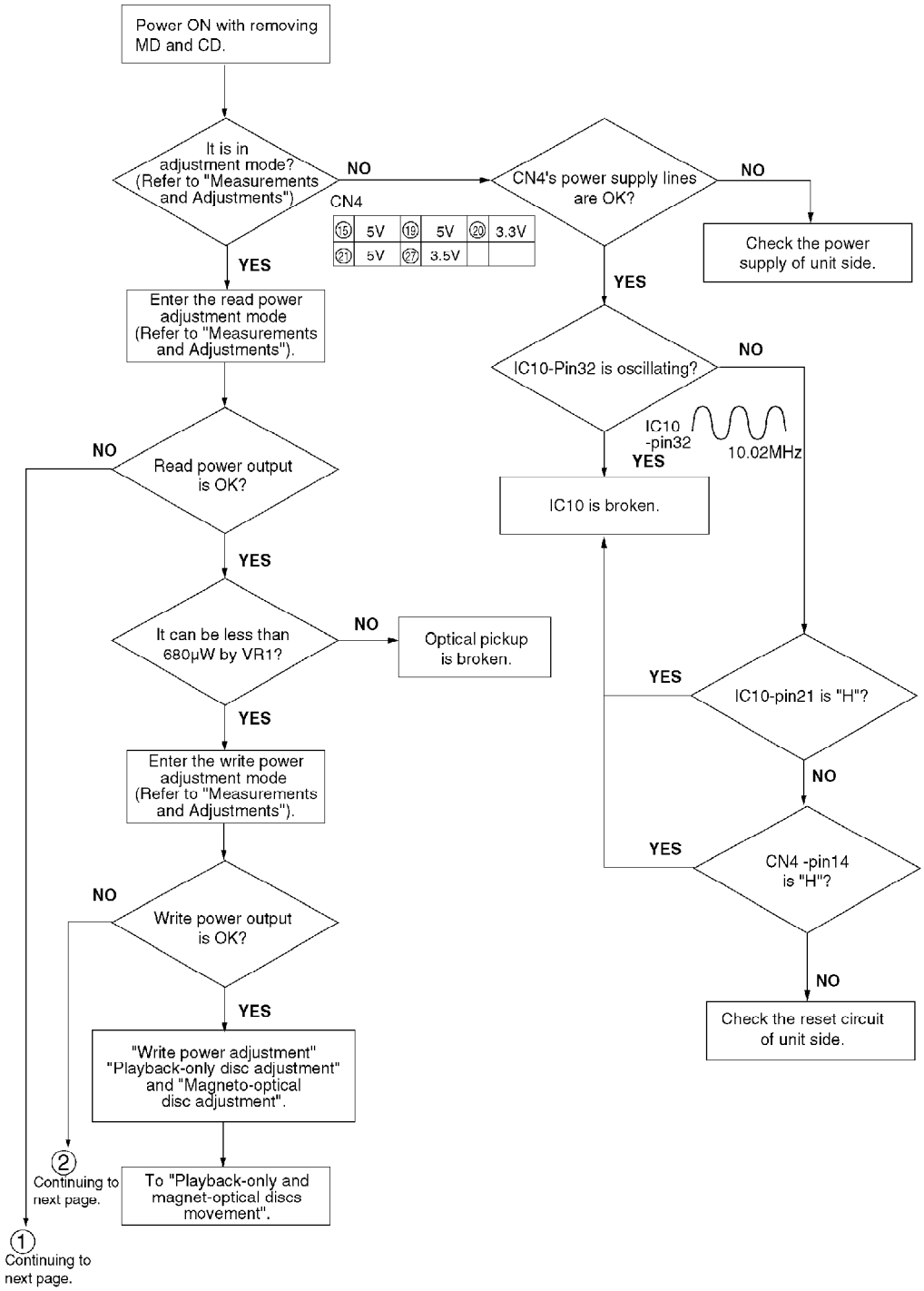
9. Press the CD EDIT button, the read power will be displayed again. Confirm that the read power is within 600 uW and 740 uW.

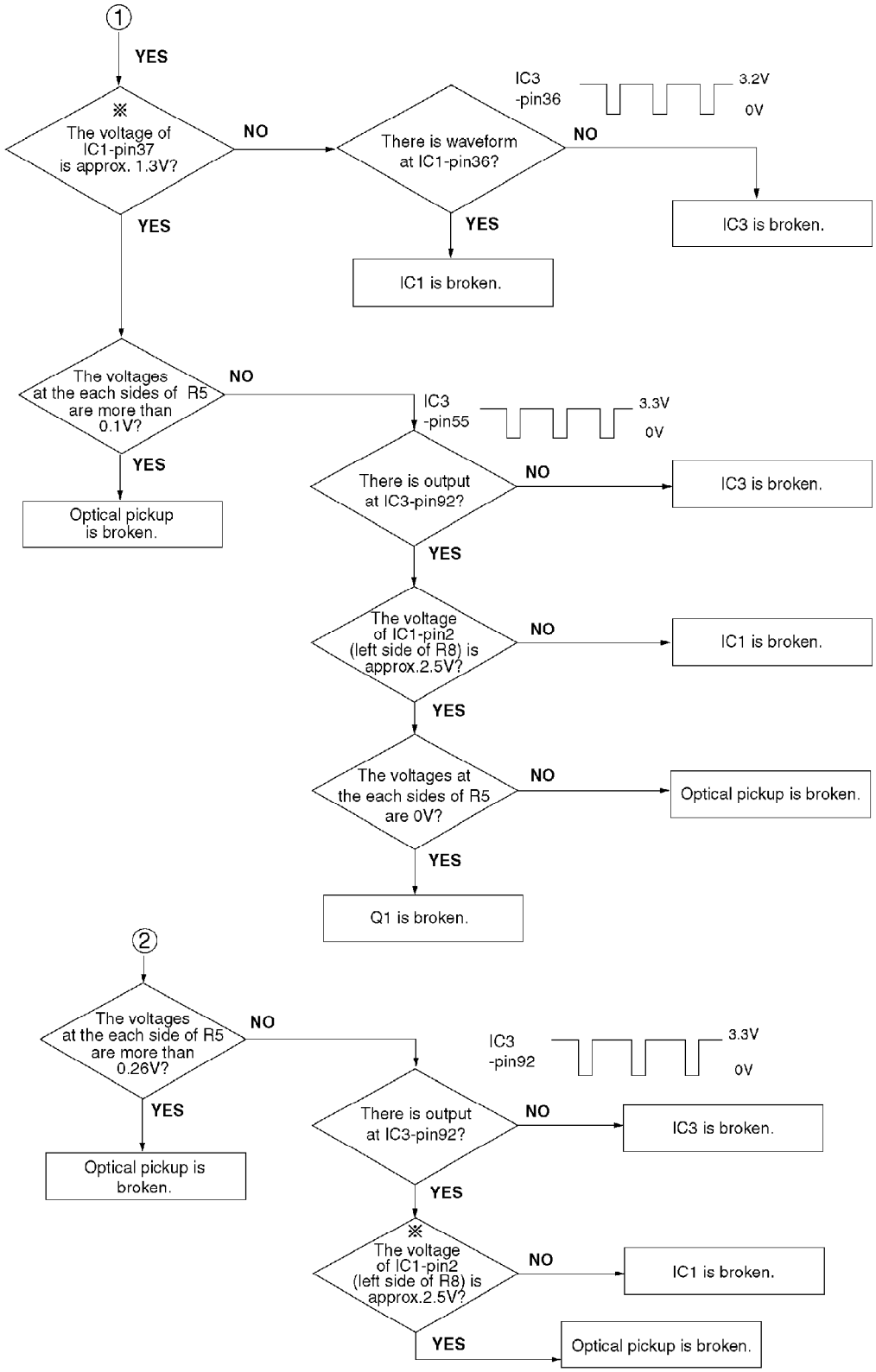
10. Then, again press the CD EDIT button. The laser power recorded in the laser ROM will be displayed.
Confirm that it is within 320 uW and 380 uW.

11. Press the ■ button and exit the adjustment mode.

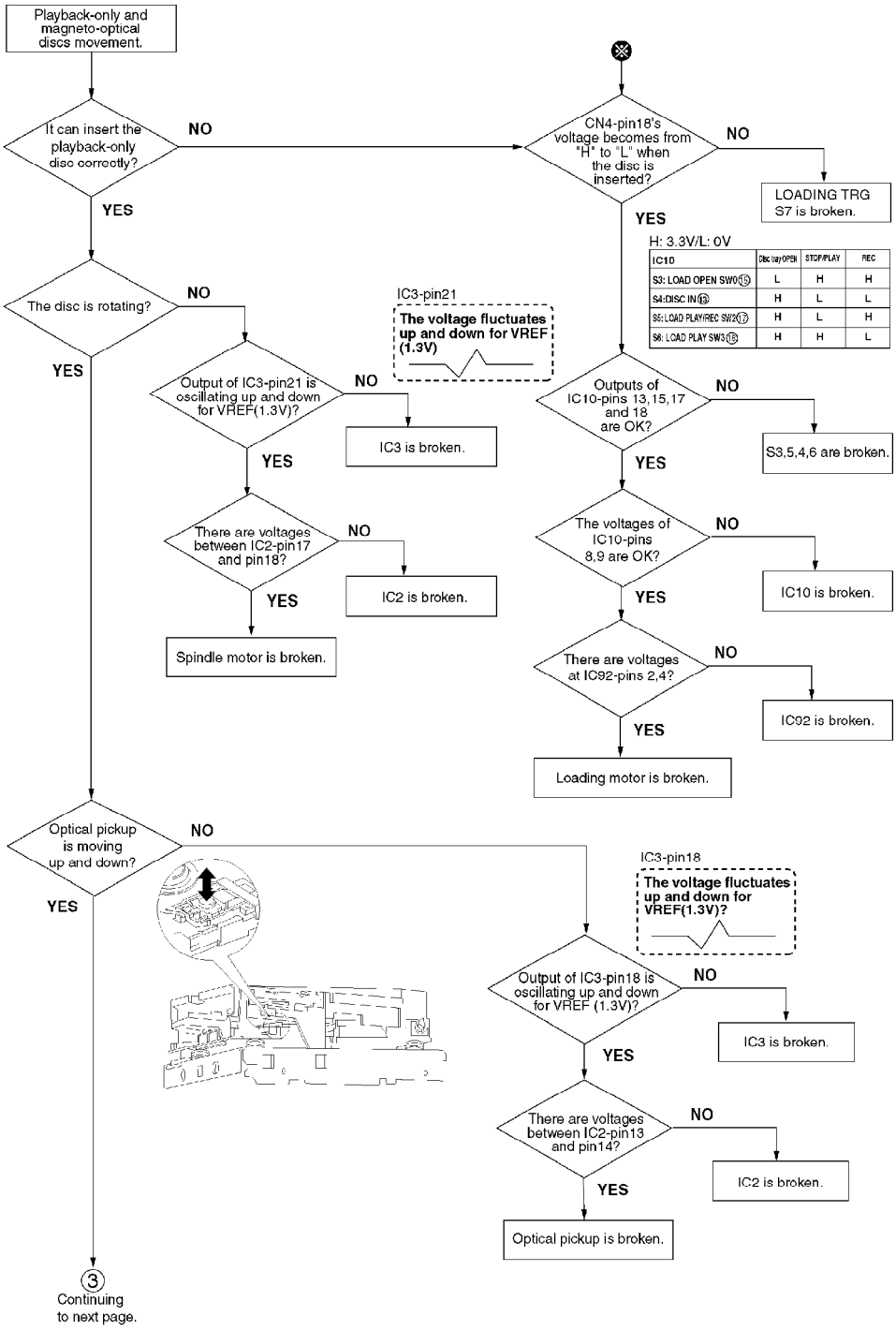
12. Turn off the power and remove the lead wire between the No. 8 pin and GND. This ends the adjustment mode.

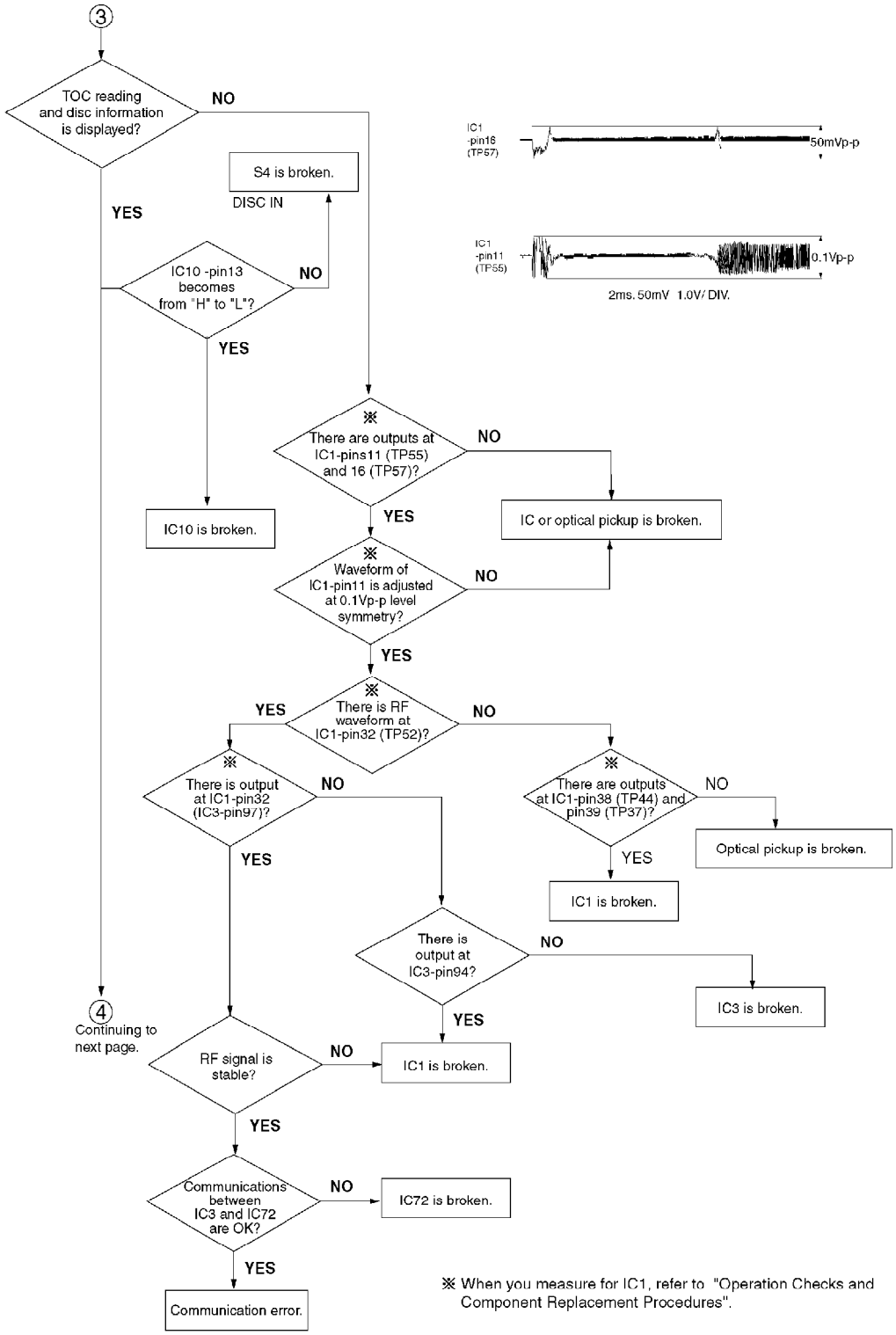
10. Troubleshooting Guide

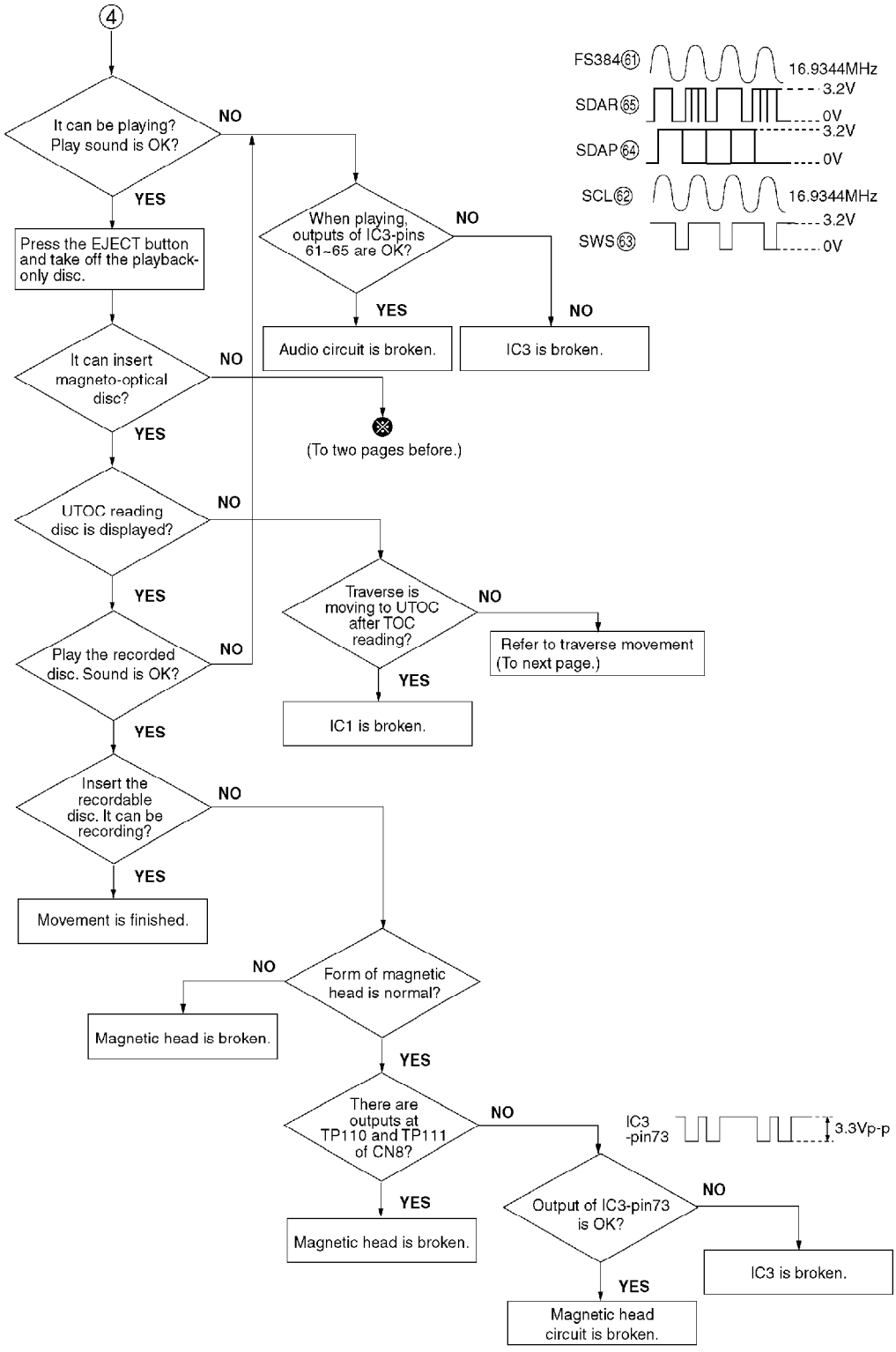

Power ON with removing MD and CD.
It is in adjustment mode? (Refer to "Measurements and Adjustments")
NO
YES
CN4
⑮ 5V ⑱ 5V ⑳ 3.3V
㉑ 5V ㉗ 3.5V
CN4's power supply lines are OK?
NO
Check the power supply of unit side.
YES
Enter the read power adjustment mode (Refer to "Measurements and Adjustments").
IC10-Pin32 is oscillating?
NO
IC10 -pin32
10.02MHz
YES
IC10 is broken.
Read power output is OK?
NO
YES
It can be less than 680µW by VR1?
NO
Optical pickup is broken.
YES
IC10-pin21 is "H"?
YES
NO
Enter the write power adjustment mode (Refer to "Measurements and Adjustments").
CN4 -pin14 is "H"?
YES
NO
Write power output is OK?
NO
YES
Check the reset circuit of unit side.
"Write power adjustment" "Playback-only disc adjustment" and "Magneto-optical disc adjustment".
② Continuing to next page.
To "Playback-only and magnet-optical discs movement".
① Continuing to next page.

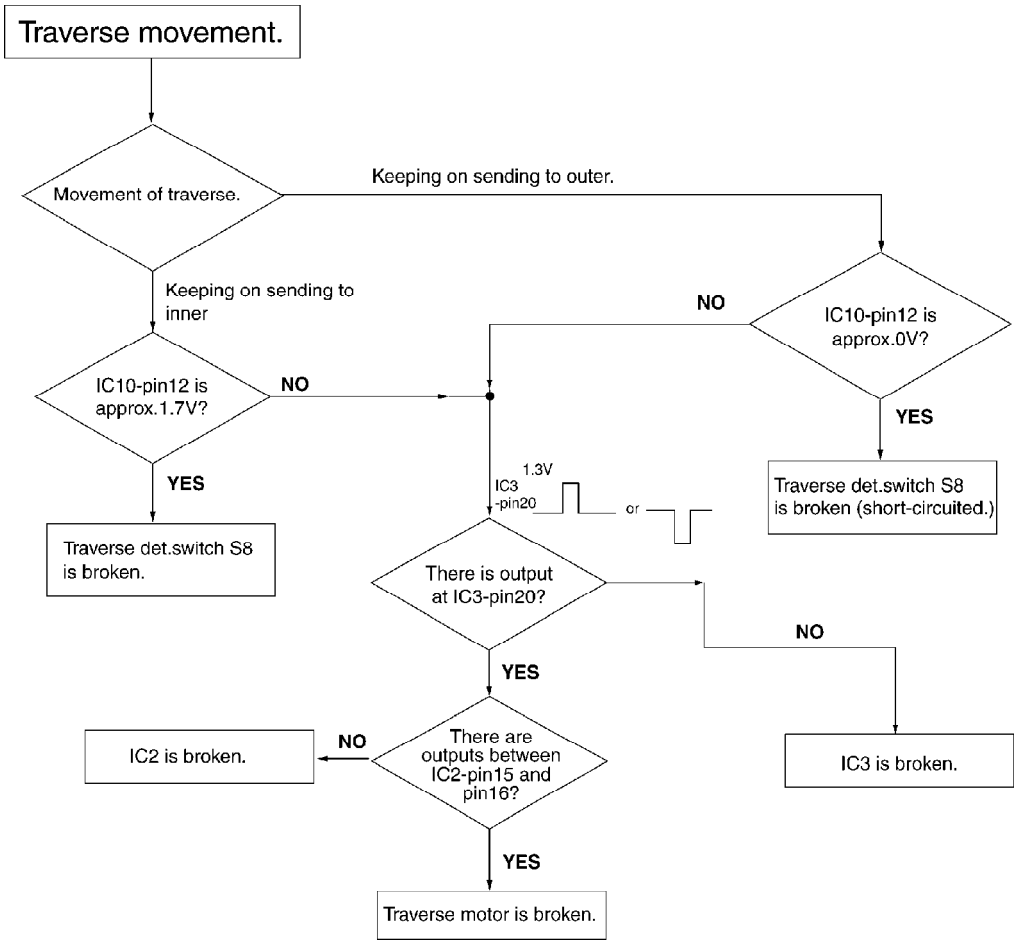


※When you measure for IC1, refer to "Operation Checks and Component Replacement Procedures".


Playback-only and magneto-optical discs movement.
It can insert the playback-only disc correctly?
NO
YES
The disc is rotating?
NO
YES
Output of IC3-pin21 is oscillating up and down for VREF(1.3V)?
NO
IC3 is broken.
YES
There are voltages between IC2-pin17 and pin18?
NO
IC2 is broken.
YES
Spindle motor is broken.
IC3-pin21
The voltage fluctuates up and down for VREF (1.3V)
CN4-pin18's voltage becomes from "H" to "L" when the disc is inserted?
NO
LOADING TRG S7 is broken.
YES
H: 3.3V/L: 0V
IC10 | Disc tray OPEN | STOP/PLAY | REC
S3: LOAD OPEN SW0 ⑮ | L | H | H
S4:DISC IN ⑯ | H | L | L
S5: LOAD PLAY/REC SW2 ⑰ | H | L | H
S6: LOAD PLAY SW3 ⑱ | H | H | L
Outputs of IC10-pins 13,15,17 and 18 are OK?
NO
S3,5,4,6 are broken.
YES
The voltages of IC10-pins 8,9 are OK?
NO
IC10 is broken.
YES
There are voltages at IC92-pins 2,4?
NO
IC92 is broken.
YES
Loading motor is broken.
Optical pickup is moving up and down?
NO
YES
IC3-pin18
The voltage fluctuates up and down for VREF(1.3V)?
Output of IC3-pin18 is oscillating up and down for VREF (1.3V)?
NO
IC3 is broken.
YES
There are voltages between IC2-pin13 and pin14?
NO
IC2 is broken.
YES
Optical pickup is broken.
③
Continuing to next page.


③
TOC reading and disc information is displayed?
NO
YES
S4 is broken.
DISC IN
IC10 -pin13 becomes from "H" to "L"?
NO
YES
IC10 is broken.
※ There are outputs at IC1-pins11 (TP55) and 16 (TP57)?
NO
YES
IC or optical pickup is broken.
※ Waveform of IC1-pin11 is adjusted at 0.1Vp-p level symmetry?
NO
YES
※ There is RF waveform at IC1-pin32 (TP52)?
YES
NO
※ There is output at IC1-pin32 (IC3-pin97)?
NO
YES
※ There are outputs at IC1-pin38 (TP44) and pin39 (TP37)?
NO
YES
Optical pickup is broken.
IC1 is broken.
There is output at IC3-pin94?
NO
YES
IC3 is broken.
④
Continuing to next page.
RF signal is stable?
NO
YES
IC1 is broken.
Communications between IC3 and IC72 are OK?
NO
YES
IC72 is broken.
Communication error.
IC1 -pin16 (TP57)
50mVp-p
IC1 -pin11 (TP55)
0.1Vp-p
2ms. 50mV 1.0V/ DIV.
※ When you measure for IC1, refer to "Operation Checks and Component Replacement Procedures".


④
It can be playing? Play sound is OK?
NO
YES
Press the EJECT button and take off the playback-only disc.
When playing, outputs of IC3-pins 61~65 are OK?
NO
YES
NO
Audio circuit is broken.
IC3 is broken.
It can insert magneto-optical disc?
NO
YES
(To two pages before.)
UTOC reading disc is displayed?
NO
YES
Traverse is moving to UTOC after TOC reading?
NO
Refer to traverse movement (To next page.)
YES
IC1 is broken.
Play the recorded disc. Sound is OK?
NO
YES
Insert the recordable disc. It can be recording?
NO
YES
Movement is finished.
Form of magnetic head is normal?
NO
Magnetic head is broken.
YES
There are outputs at TP110 and TP111 of CN8?
NO
YES
Magnetic head is broken.
Output of IC3-pin73 is OK?
NO
IC3 is broken.
YES
Magnetic head circuit is broken.
FS384 61
16.9344MHz
3.2V
SDAR 65
0V
3.2V
SDAP 64
0V
SCL 62
16.9344MHz
3.2V
SWS 63
0V
IC3 -pin73
3.3Vp-p



11. Schematic Diagram Notes

11.1. Schemtic Diagram Notes

This schematic diagram may be modified at any time with the development of new technology.

Notes:

- S1 : PROTECT det. switch.
- S2 : REFLECT det. switch.
- S3 : LOAD OPEN det. switch.
- S4 : DISC IN det. switch.
- S5 : LOAD PLAY/REC det. switch.
- S6 : LOAD PLAY det. switch.
- S7 : LOAD TRG det. switch.
- S8 : Traverse det. switch.
- S401 : MD eject (⏏ EJECT) switch.
- S402 : CD edit (CD EDIT) switch.
- S403 : Enter (ENTER) switch.

- S404 : Edit (EDIT) switch.
- S405 : Stop (■) switch.
- S406 : Pause (❚❚) switch.
- S407 : Play (▶) switch.
- S408 : Rec (REC) switch.
- S409 : R.skip/search (⏮ / ⏪) switch.
- S410 : F.skip/search (⏩ / ⏭) switch.
- S411 : Marking (MARKING) switch in “AUTO” position.
- S412 : Track (TRACK) switch in “ONE” position.
- VR1 : Laser power adj. V.R..
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

No mark: MD STOP
( ): MD play [1kHz, L+R, 0dB]
<>: MD rec. [1kHz, L+R, 0dB]

Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. Furthermore, special parts which have purpose of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.

Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
Cover the parts boxes made of plastics with aluminum foil.
Ground the soldering iron.
Put a conductive mat on the work table.
Do not touch the legs of IC or LSI with the fingers directly.

Voltage and signal lines

: Positive voltage line

: Playback signal

: Recording signal

11.2. Type Illustration of IC's, Transistors and Diodes

12. Schematic Diagram

13. Printed Circuit Board and Wiring Connection Diagram

14. Block Diagram

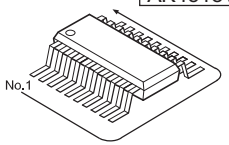
15. Wiring Connection Diagram

16. Terminal Function of IC's

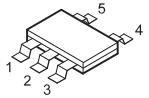
16.1. IC1 (AN8772FHQ) : RF AMP

Pin No.	Mark	I/O Division	Function
1	CENVD	—	D signal det. capacitor connection terminal
2	LDO	O	Laser amp output terminal
3	APCPD	I	Photo diode light quantity det. input terminal
4	LD IN	I	Laser amp reverse input terminal
5	APC REF	I	APC amp criterion voltage input terminal
6	TEMP IN	I	Temperature sensor amp input terminal
7	TEMP	O	Temperature sensor amp output terminal
8	ADIP	O	ADIP signal output terminal
9	TOFS	I	Tracking error offset adjustment terminal
10	TBAL	I	Tracking ballance adjustment terminal
11	TE	O	Tracking error signal output terminal
12	CRS IN	I	Track cross input terminal

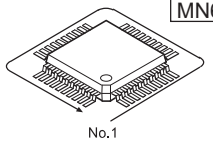
M5M34051FPE1	16PIN
AK4518VF-E2	24PIN



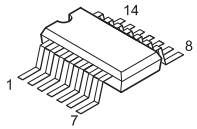
PST597ENR
RN5RG33AA-TL
RN5RZ26BA-TR



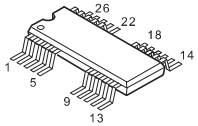
AN8772FHQ	48PIN
MN101D03DAA	80PIN
MN66616RA1	100PIN



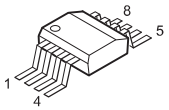
TC74HCT00AFL
TC74HCT7007A



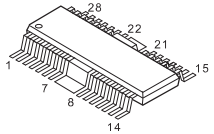
MNV4400-T8T



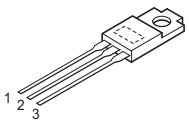
TC7W04FTE12L



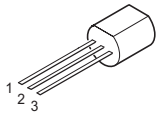
AN8814SB-E1



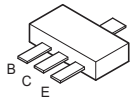
BA17805T
BA178M05T



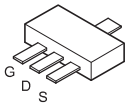
S81233SGY-Z



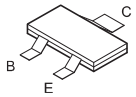
2SB1121ST-TD



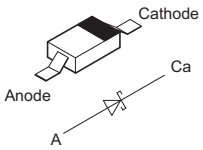
2SJ278MYTR
2SK1764KYTR



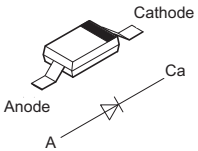
2SB1295-6-TB
2SB1462STX
2SB709ATX
DTA114YUA106
DTC114YETL
UN5111TX
UN5214TX



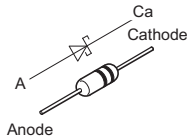
MA728TX



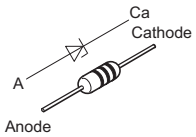
SC80209TE12R



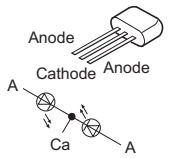
MA719TA



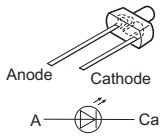
MA4033MTA



SML79420C

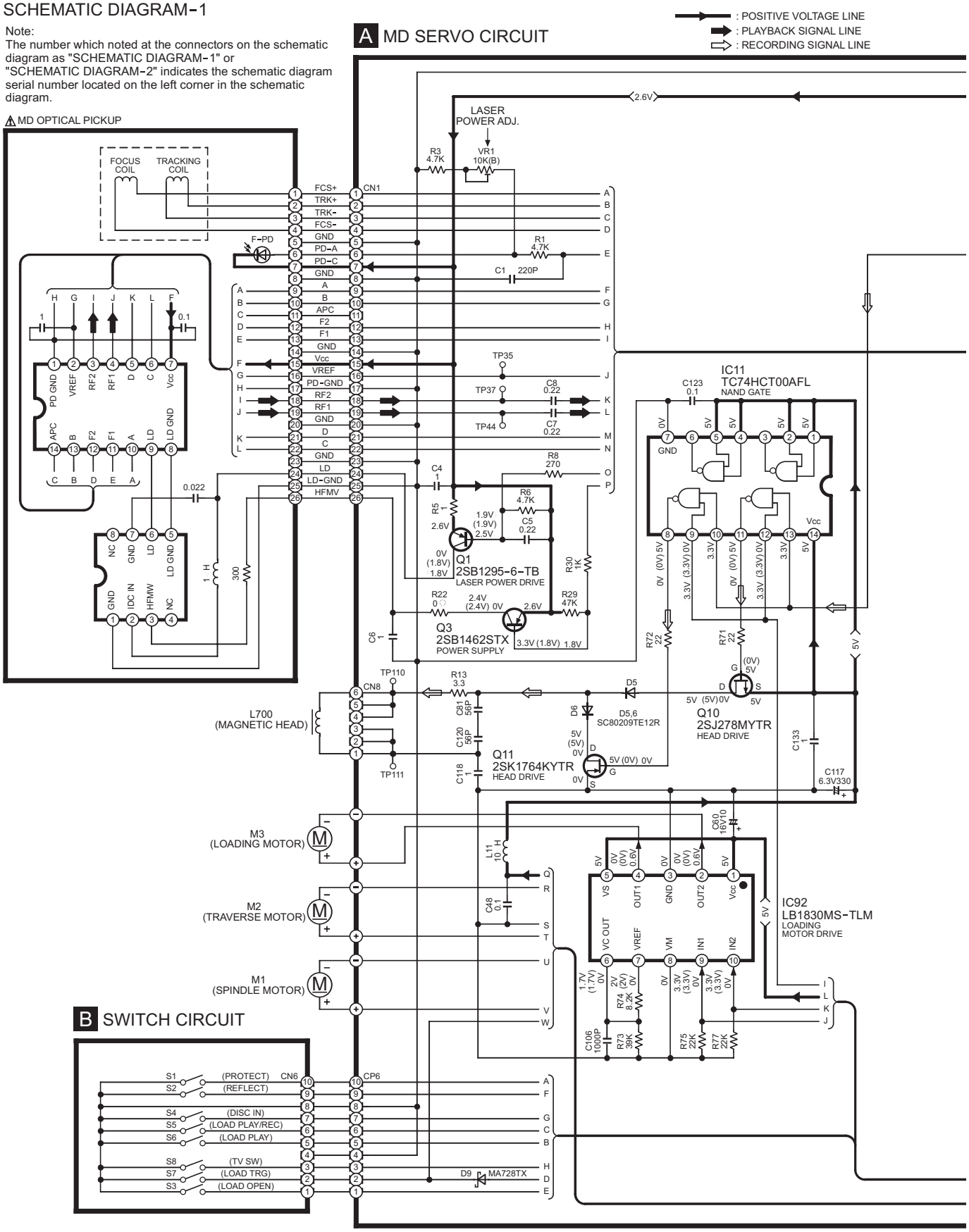


LNJ201LPQJA



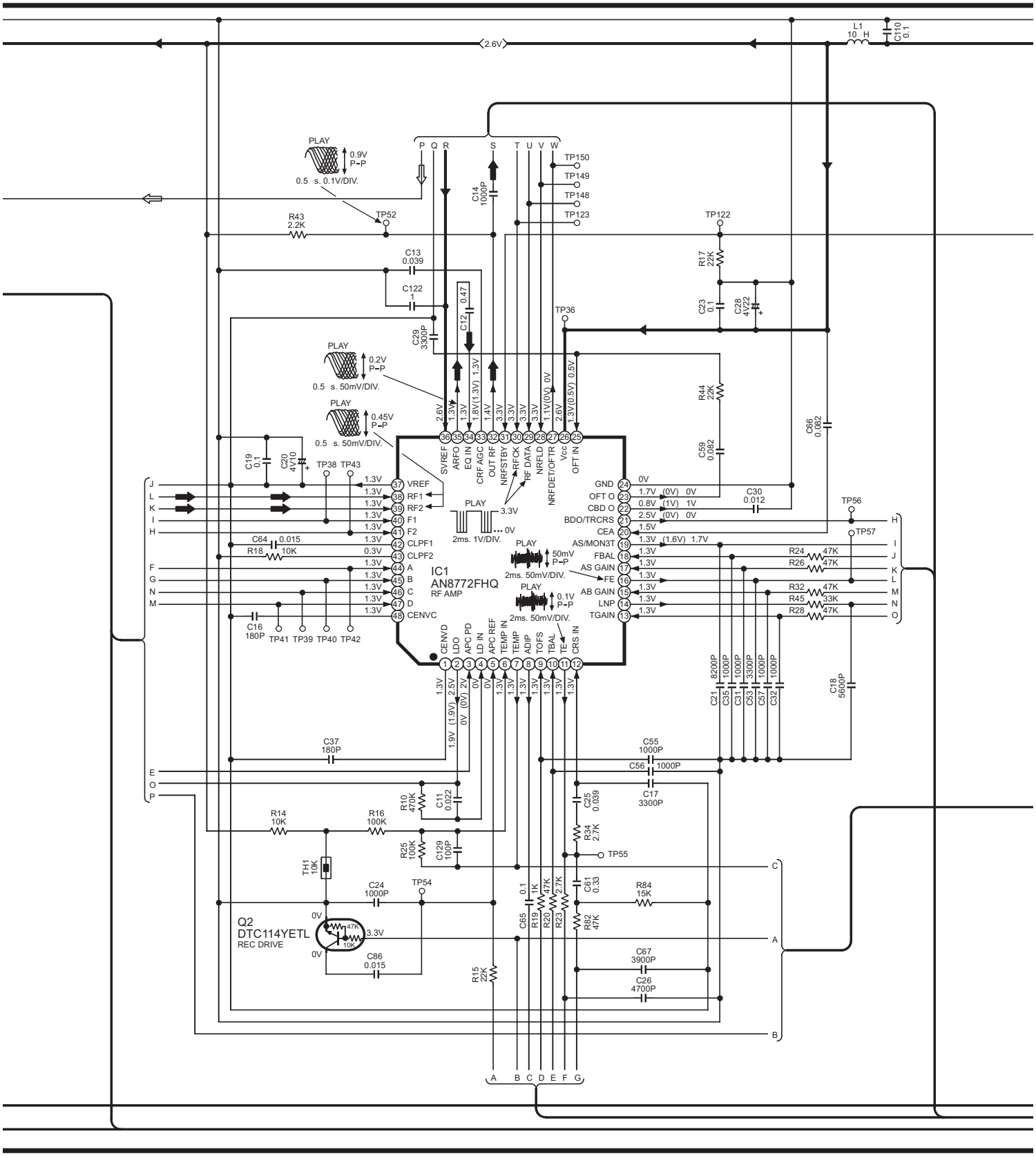
SCHEMATIC DIAGRAM-1

Note:
The number which noted at the connectors on the schematic diagram as "SCHEMATIC DIAGRAM-1" or "SCHEMATIC DIAGRAM-2" indicates the schematic diagram serial number located on the left corner in the schematic diagram.



SCHEMATIC DIAGRAM-2

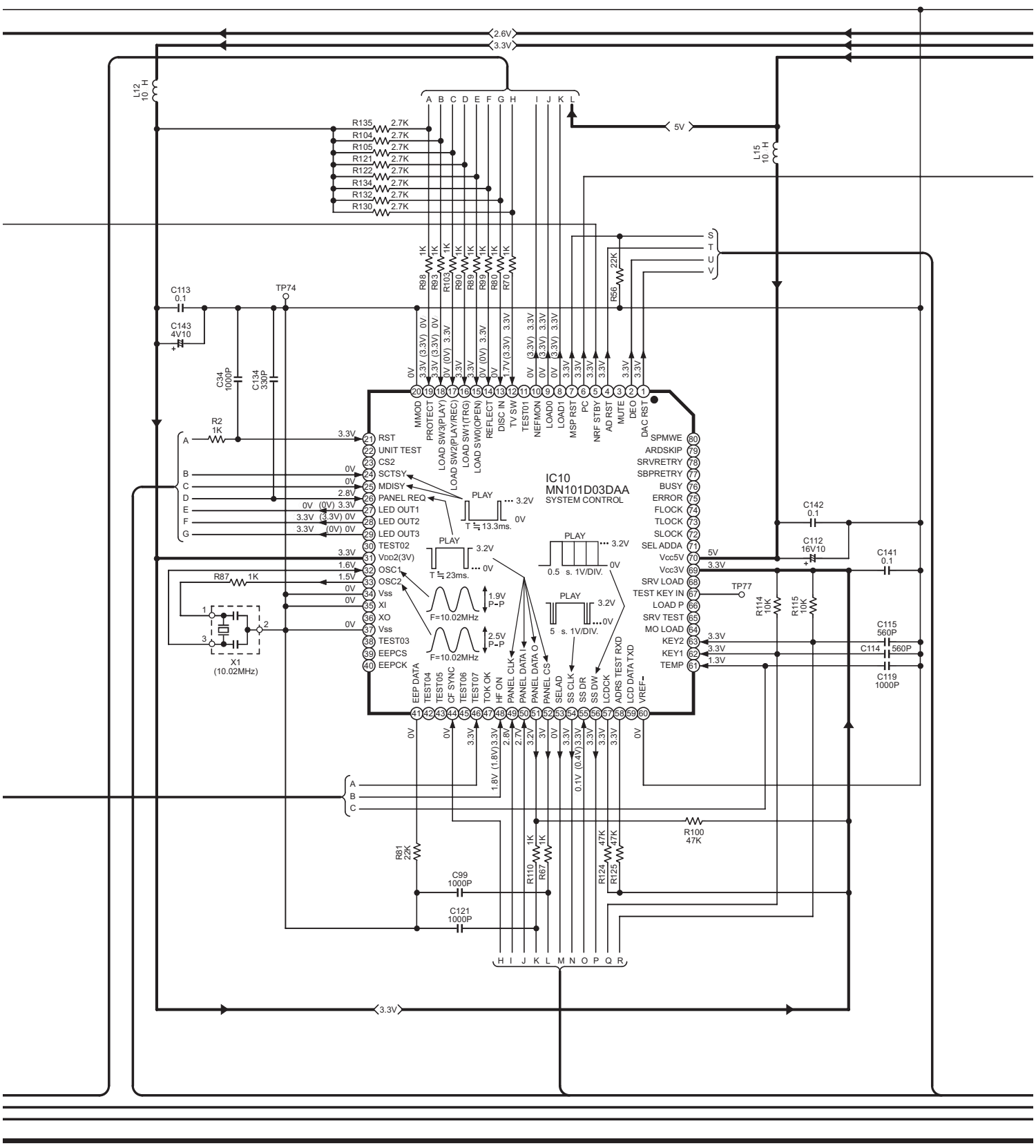
: POSITIVE VOLTAGE LINE : PLAYBACK SIGNAL LINE : RECORDING SIGNAL LINE



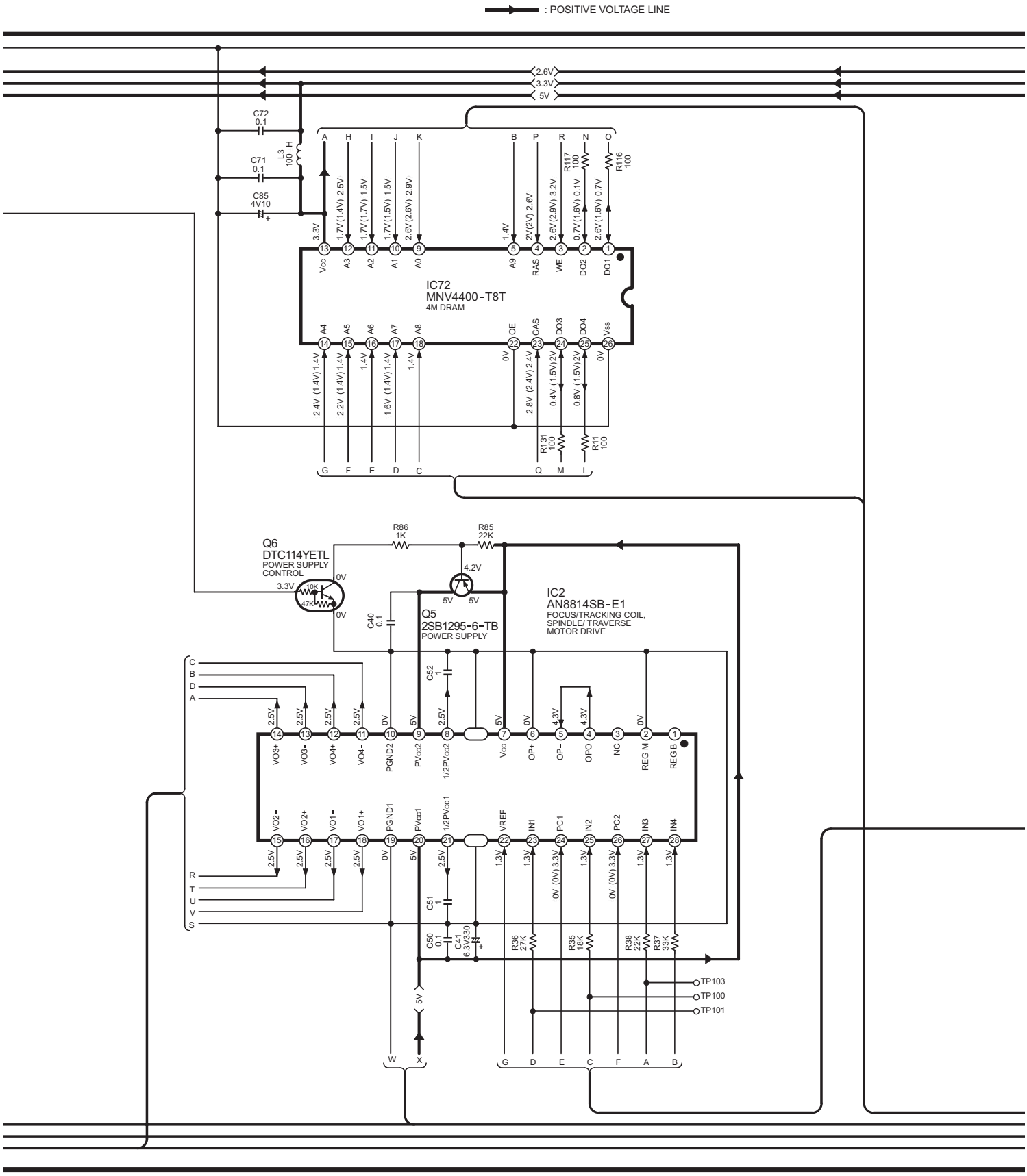
SCHEMATIC DIAGRAM–3

A MD SERVO CIRCUIT

: POSITIVE VOLTAGE LINE



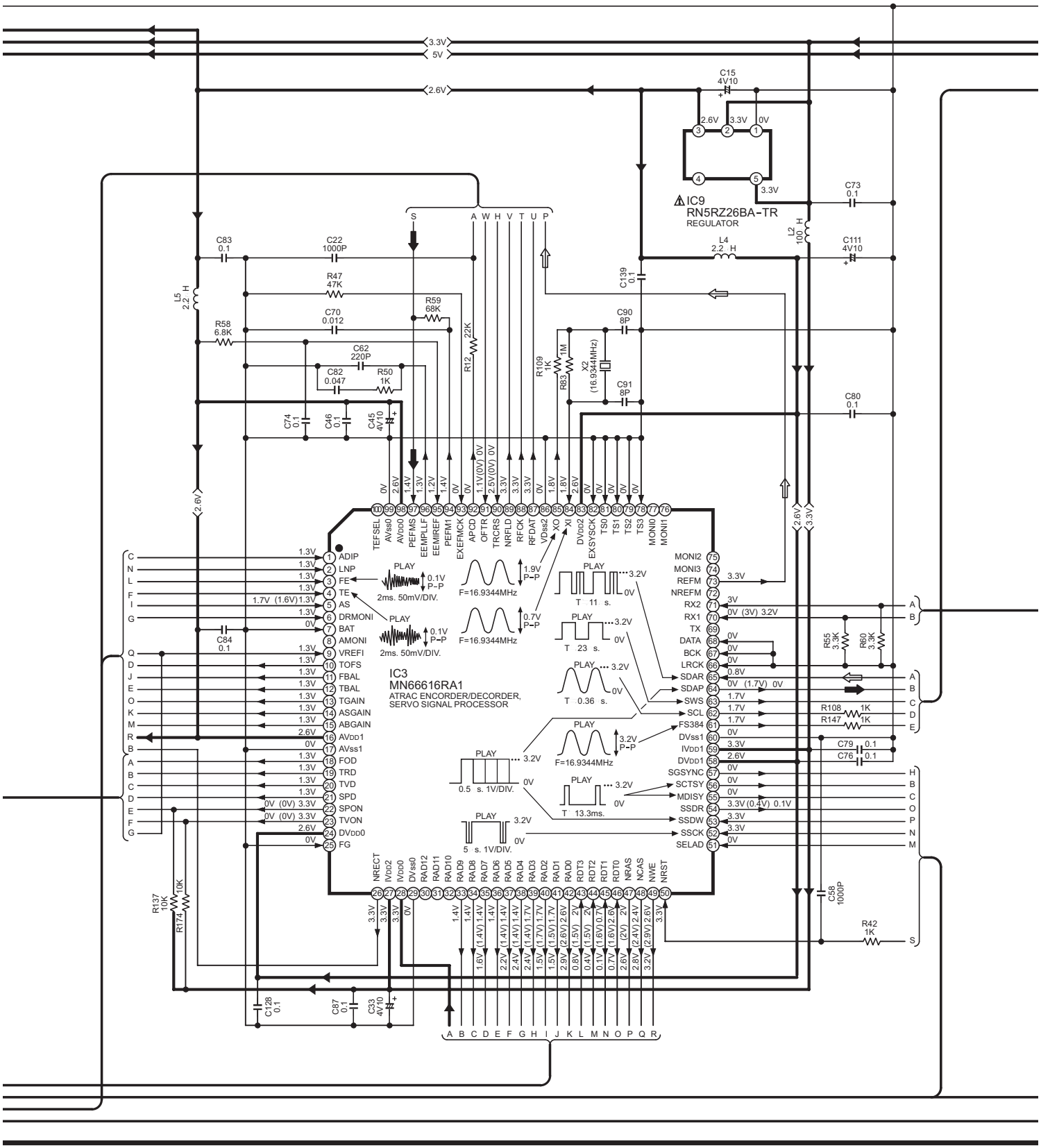
SCHEMATIC DIAGRAM-4



SCHEMATIC DIAGRAM–5

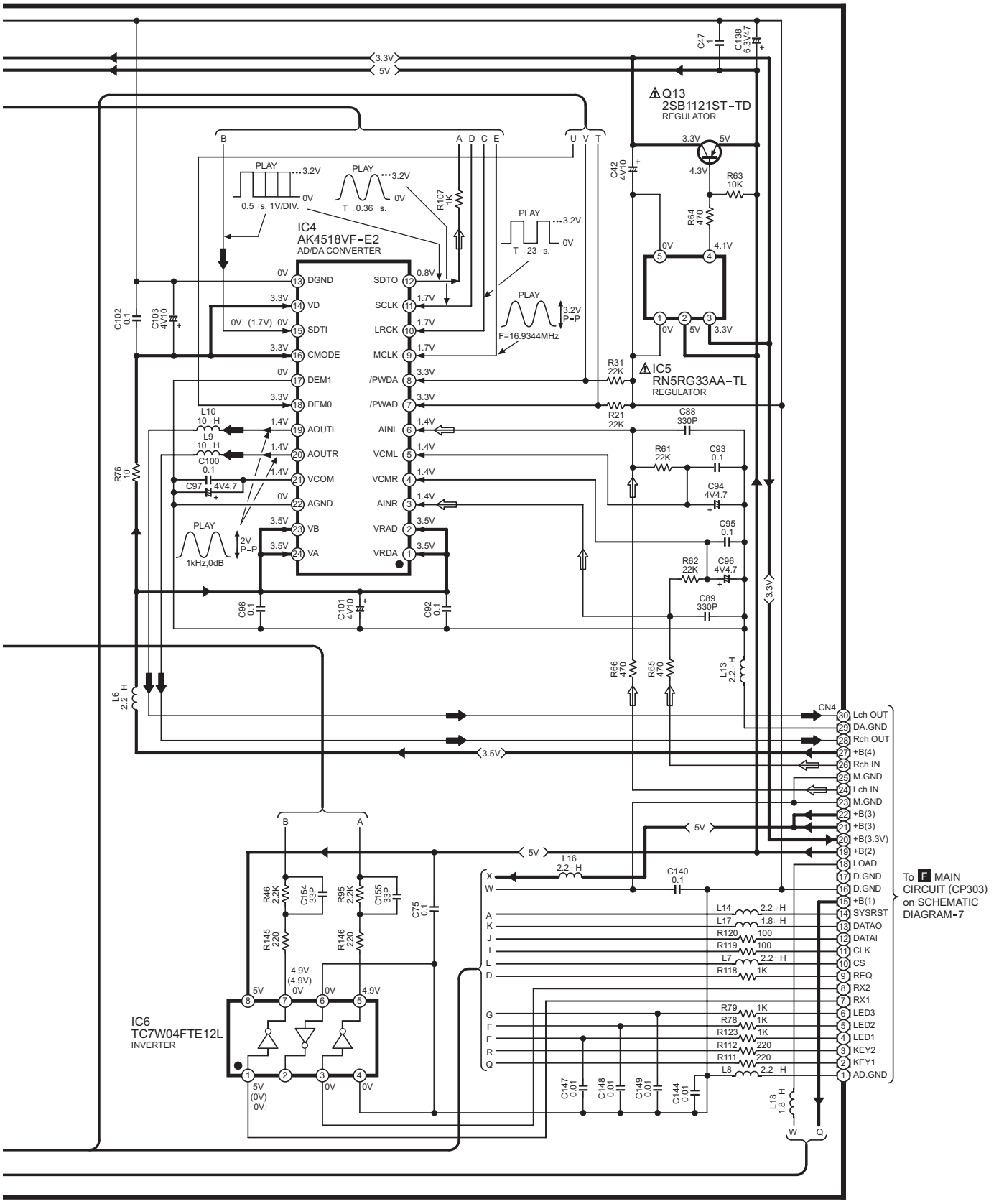
A MD SERVO CIRCUIT

: POSITIVE VOLTAGE LINE : PLAYBACK SIGNAL LINE : RECORDING SIGNAL LINE

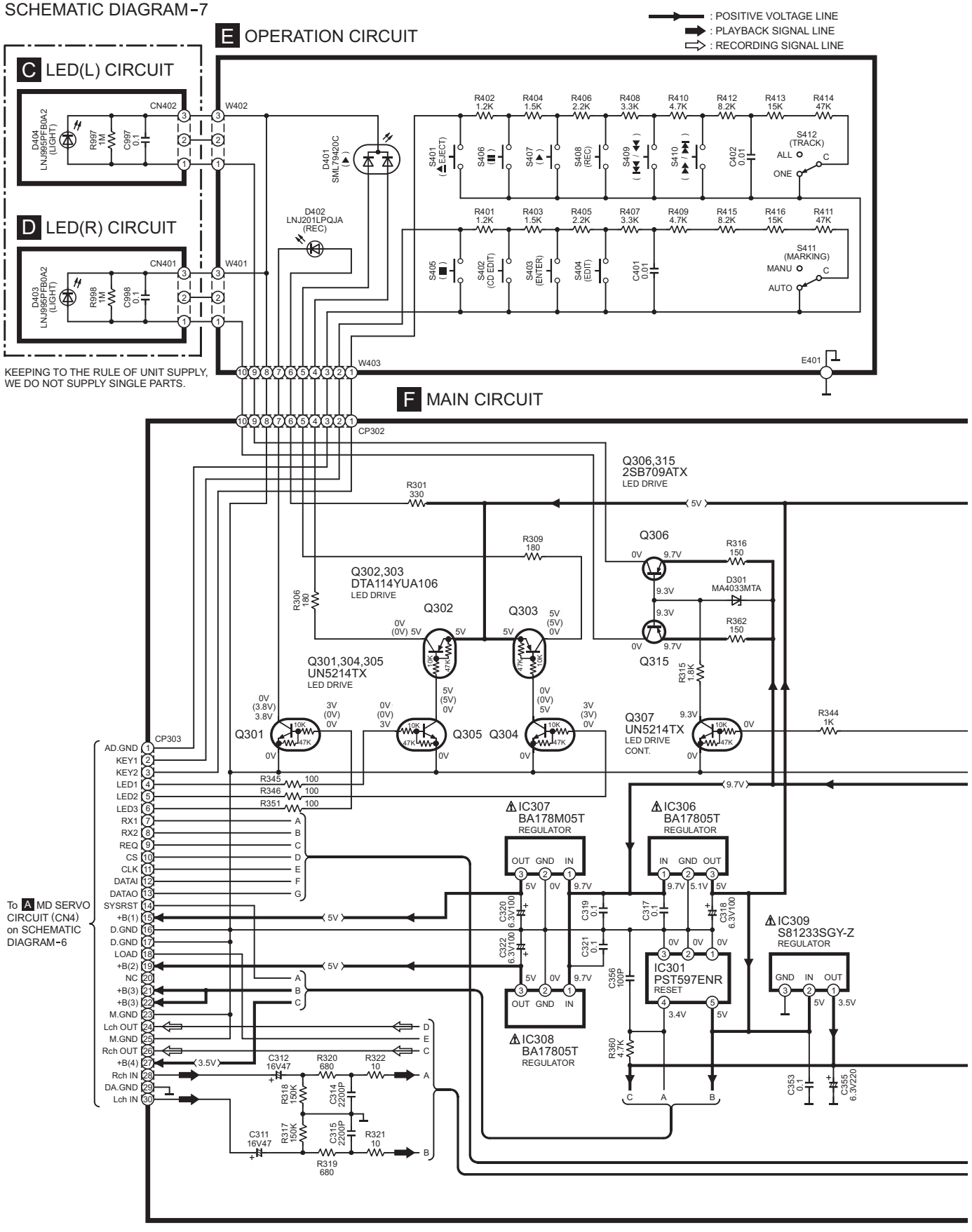


SCHEMATIC DIAGRAM-6

: POSITIVE VOLTAGE LINE : PLAYBACK SIGNAL LINE : RECORDING SIGNAL LINE

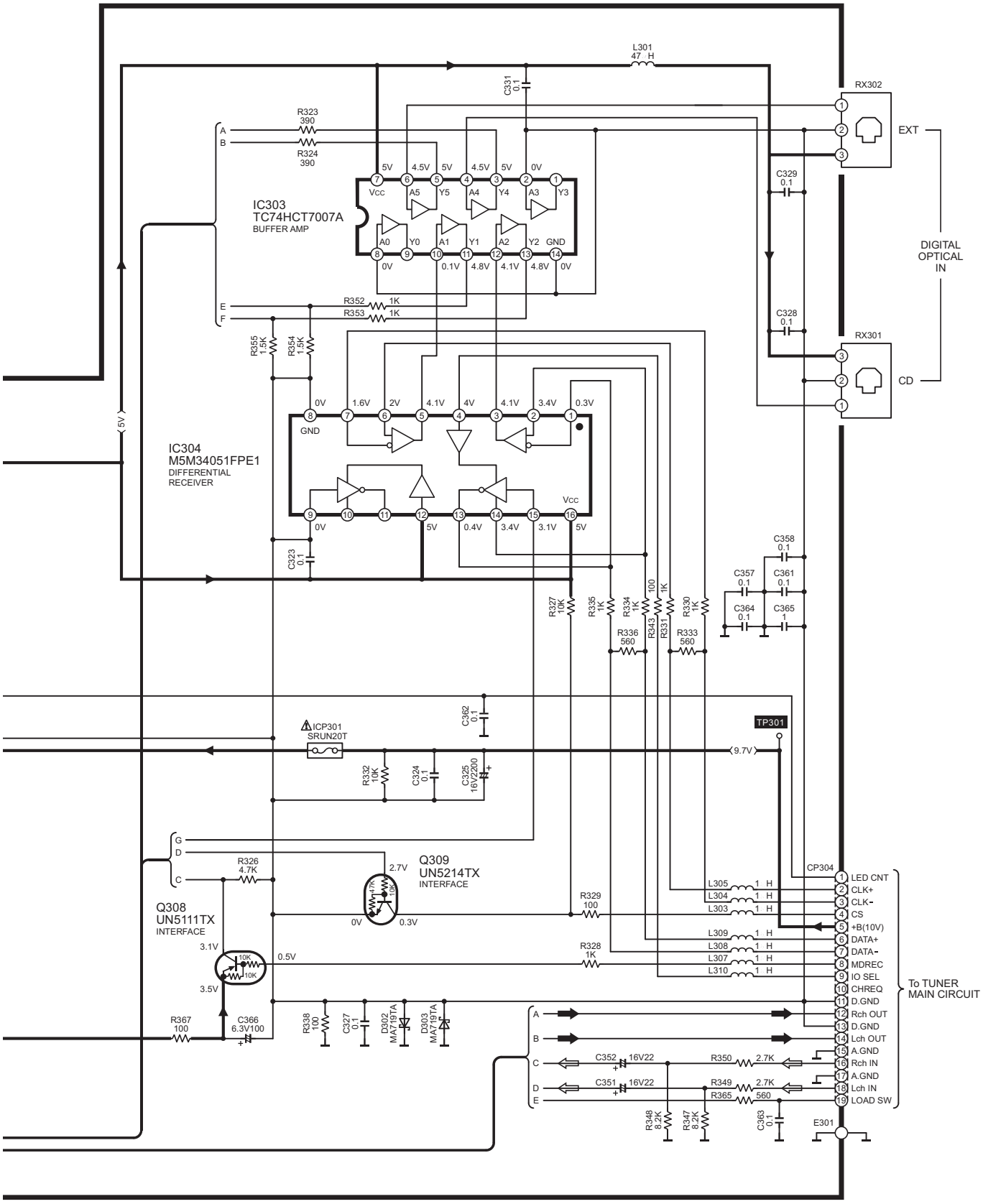


SCHEMATIC DIAGRAM–7

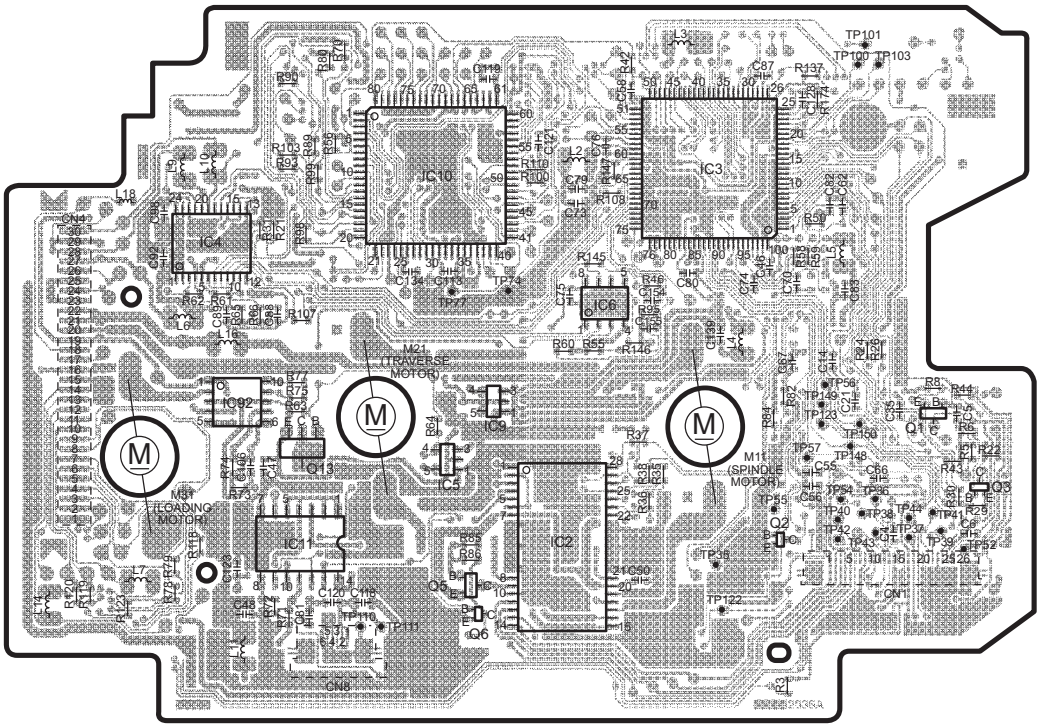


SCHEMATIC DIAGRAM-8

: POSITIVE VOLTAGE LINE : PLAYBACK SIGNAL LINE : RECORDING SIGNAL LINE



A MD SERVO P.C.B. (SIDE:A)

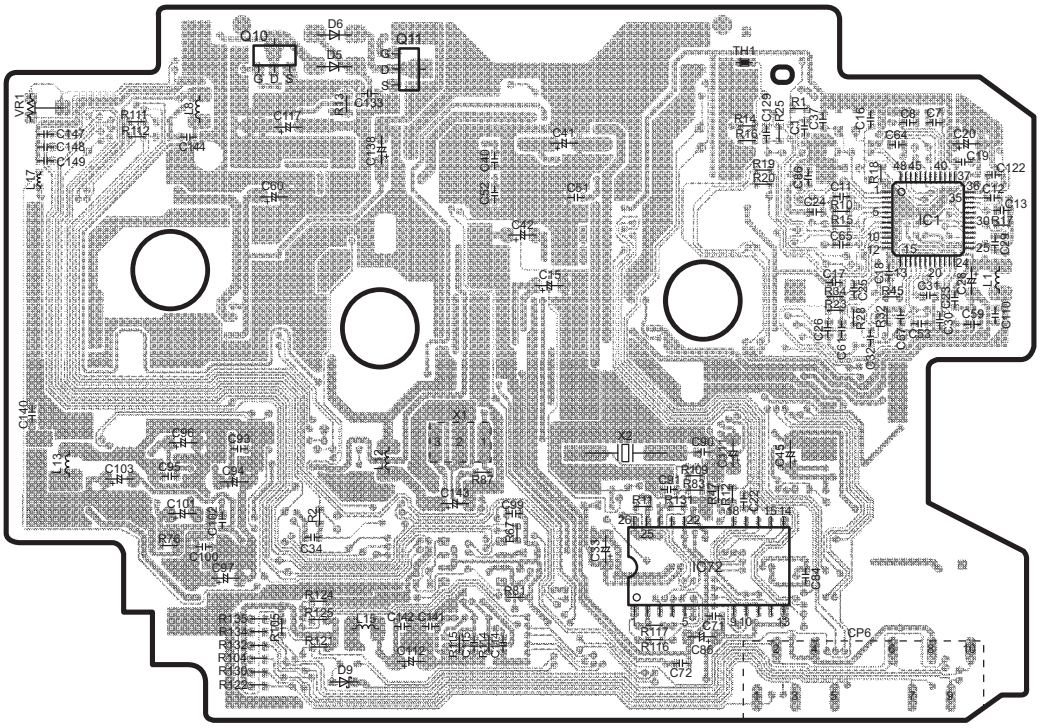


(REP2761A-T)

■ELECTRICAL PARTS LOCATION

Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.
AMD SERVO P.C.B. (SIDE:A)													
IC2	4D	L14	4A	TP74	3C	R36	4D	R75	3B	R137	2E	C75	3D
IC3	2D	L16	3B	TP77	3C	R37	3D	R77	3B	R145	2D	C76	2D
IC4	2B	L18	2B	TP100	2E	R38	4D	R78	4B	R146	3D	C79	2D
IC5	3C	CN1	4E	TP101	1E	R42	2D	R79	4B	R147	2D	C80	3D
IC6	3D	CN4	3A	TP103	2E	R43	3F	R80	2C	R174	2E	C81	4C
IC9	3C	CN8	4C	TP110	4C	R44	3F	R82	3E	C4	4E	C82	2E
IC10	2C	M11	3D	TP111	4C	R46	3D	R84	3E	C5	3F	C83	3E
IC11	4B	M21	3C	TP122	4E	R50	2E	R85	4C	C6	4F	C87	2E
IC92	3B	M31	3B	TP123	3E	R55	3D	R86	4C	C14	3E	C88	3B
Q1	3F	TP35	4E	TP148	3E	R56	2C	R89	2C	C21	3E	C89	3B
Q2	4E	TP36	4E	TP149	3E	R58	2E	R90	2B	C35	3E	C92	2B
Q3	4F	TP37	4E	TP150	3E	R59	2E	R93	2B	C46	3E	C98	2B
Q5	4C	TP38	4E	R3	5E	R60	3D	R95	3D	C47	4B	C106	4B
Q6	4C	TP39	4F	R5	3F	R61	3B	R98	2B	C48	4B	C113	3C
Q13	3B	TP40	4E	R6	3F	R62	3B	R99	2C	C50	4D	C118	4C
L2	2D	TP41	4F	R8	3F	R63	3B	R100	2D	C55	4E	C119	2C
L3	1D	TP42	4E	R21	2B	R64	3C	R103	2B	C56	4E	C120	4C
L4	3E	TP43	4E	R22	3F	R65	3B	R107	3B	C58	2D	C121	2D
L5	2E	TP44	4E	R24	3E	R66	3B	R108	2D	C62	2E	C123	4B
L6	3B	TP52	4F	R26	3E	R70	1C	R110	2D	C66	4E	C128	2E
L7	4B	TP54	4E	R29	4F	R71	4B	R118	4B	C67	3E	C134	3C
L9	2B	TP55	4E	R30	4F	R72	4B	R119	4A	C70	3E	C139	3E
L10	2B	TP56	3E	R31	2B	R73	4B	R120	4A	C73	2D	C154	3D
L11	4B	TP57	3E	R35	4D	R74	4B	R123	4B	C74	3E	C155	3D

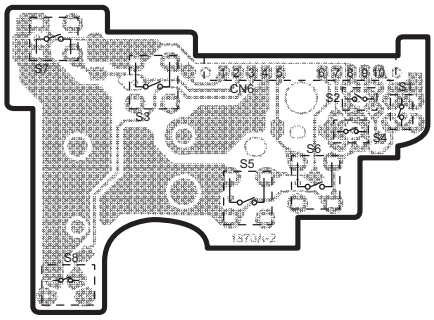
A MD SERVO P.C.B. (SIDE:B)



■ELECTRICAL PARTS LOCATION

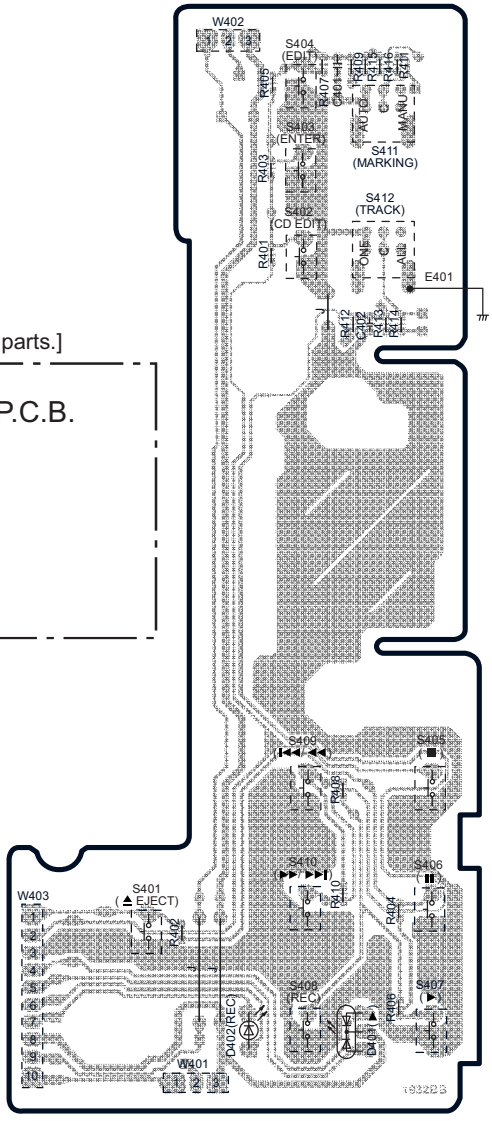
Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.	Ref. No.	Lo. No.
A MD SERVO P.C.B. (SIDE:B)											
IC1	2F	R13	2C	R111	2B	C17	3E	C53	3F	C103	4B
IC72	4D	R14	2E	R112	2B	C18	3E	C57	3E	C110	3F
Q10	1B	R15	2E	R114	4C	C19	2F	C59	3F	C111	3E
Q11	2C	R16	2E	R115	4C	C20	2F	C60	2B	C112	4C
D5	2C	R17	2F	R116	4D	C22	4E	C61	3E	C114	4C
D6	1C	R18	2E	R117	4D	C23	3F	C64	2E	C115	4C
D9	5C	R19	2E	R121	4C	C24	2E	C65	2E	C117	2B
VR1	2A	R20	2E	R122	5B	C25	3E	C71	4E	C122	2F
TH1	2E	R23	3E	R124	4C	C26	3E	C72	4D	C129	2E
L1	3F	R25	2E	R125	4C	C28	3F	C84	4E	C133	2C
L8	2B	R28	3E	R130	5B	C29	2F	C85	4D	C138	2C
L12	3C	R32	3E	R131	4D	C30	3F	C86	2E	C140	3A
L13	3A	R34	3E	R132	4B	C31	3F	C90	3D	C141	4C
L15	4C	R45	3E	R134	4B	C32	3E	C91	4D	C142	4C
L17	2A	R47	4E	R135	4B	C33	4D	C93	3B	C143	4C
X1	3C	R67	4D	C1	2E	C34	4C	C94	4B	C144	2B
X2	3D	R76	4B	C7	2F	C37	2E	C95	4B	C147	2A
CP6	5E	R81	4D	C8	2E	C40	2C	C96	3B	C148	2A
R1	2E	R83	4D	C11	2E	C41	2D	C97	4B	C149	2A
R2	4C	R87	4C	C12	2F	C42	2D	C99	4D		
R10	2E	R104	4B	C13	2F	C45	3E	C100	4B		
R11	4D	R105	4B	C15	3D	C51	2D	C101	4B		
R12	4E	R109	4D	C16	2E	C52	2C	C102	4B		

B SWITCH P.C.B.



(REP2575A)

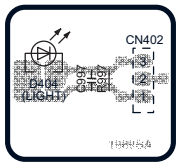
E OPERATION P.C.B.



(REP2775AB-S)

[Keeping to the rule of unit supply, we do not supply single parts.]

C LED(L) P.C.B.



(REP2683B-S)

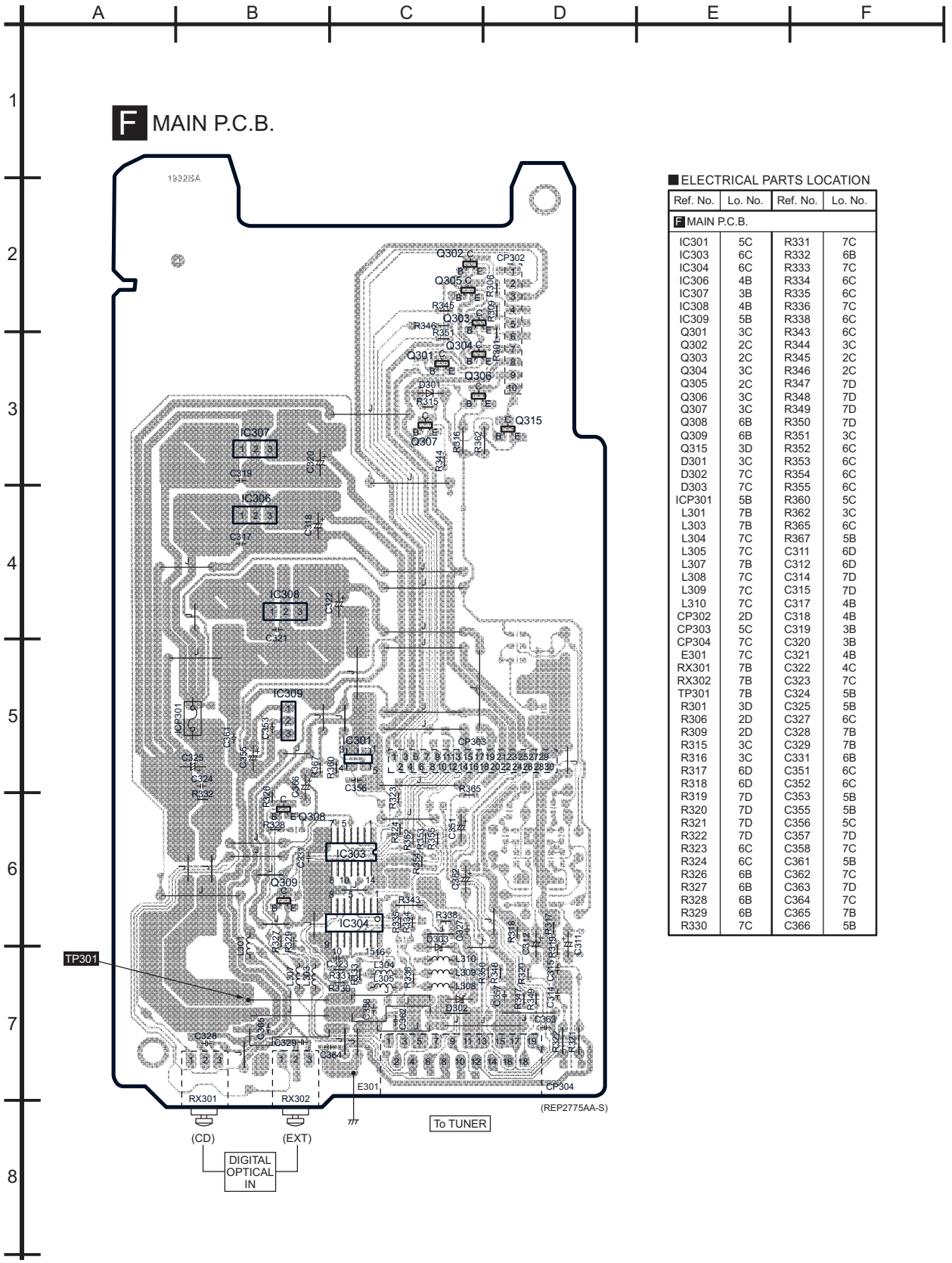
D LED(R) P.C.B.

(REP2683B-S)

■ ELECTRICAL PARTS LOCATION

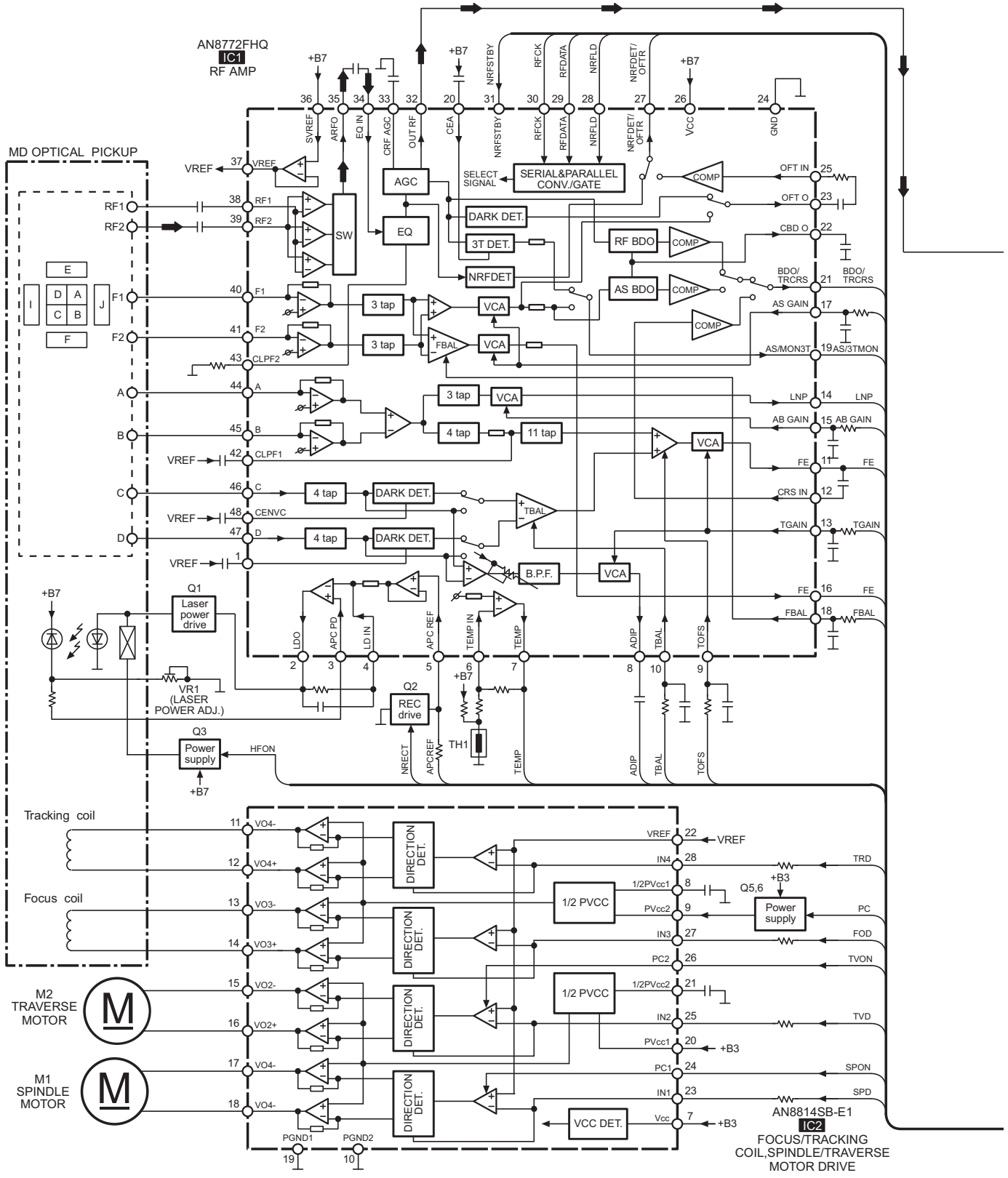
Ref. No.	Lo. No.	Ref. No.	Lo. No.
B SWITCH P.C.B.			
S1	2C	S6	2C
S2	2C	S7	1B
S3	2B	S8	3B
S4	2C	CN6	2C
S5	2C		
C LED(L) P.C.B.			
D404	4B	R997	4B
CN402	4B	C997	4B
D LED(R) P.C.B.			
D403	4D	R998	4C
CN401	4C	C998	4C
E OPERATION P.C.B.			
D401	7F	R401	3E
D402	7E	R402	6E
S401	6D	R403	2E
S402	3E	R404	6F
S403	2E	R405	2E
S404	2E	R406	7F
S405	5F	R407	2E
S406	6F	R408	5E
S407	7F	R409	2F
S408	7E	R410	6E
S409	5E	R411	2F
S410	6E	R412	3F
S411	2F	R413	3F
S412	3F	R414	3F
W401	7E	R415	2F
W402	2E	R416	2F
W403	6D	C401	2E
E401	3F	C402	3F

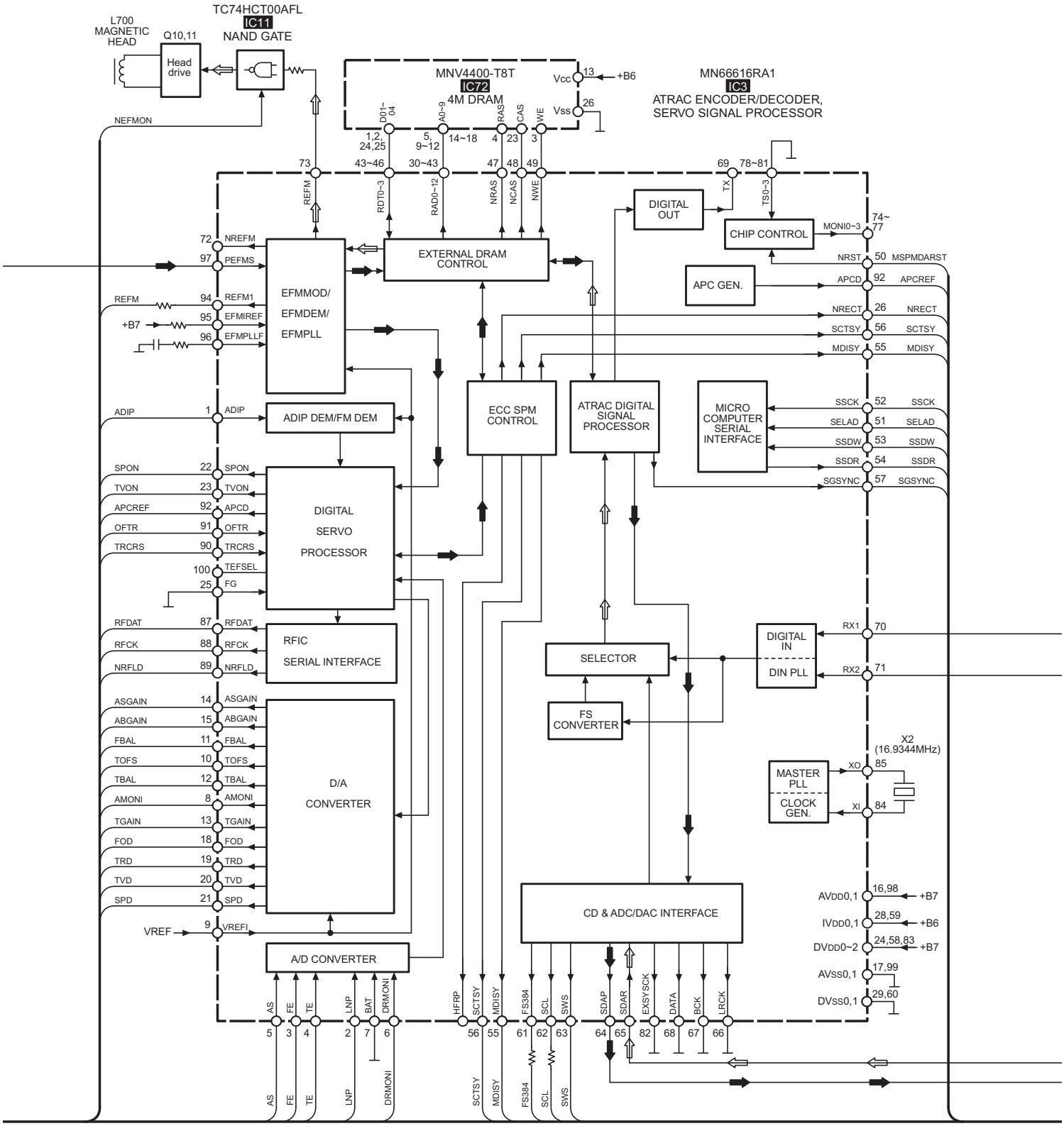
F MAIN P.C.B.

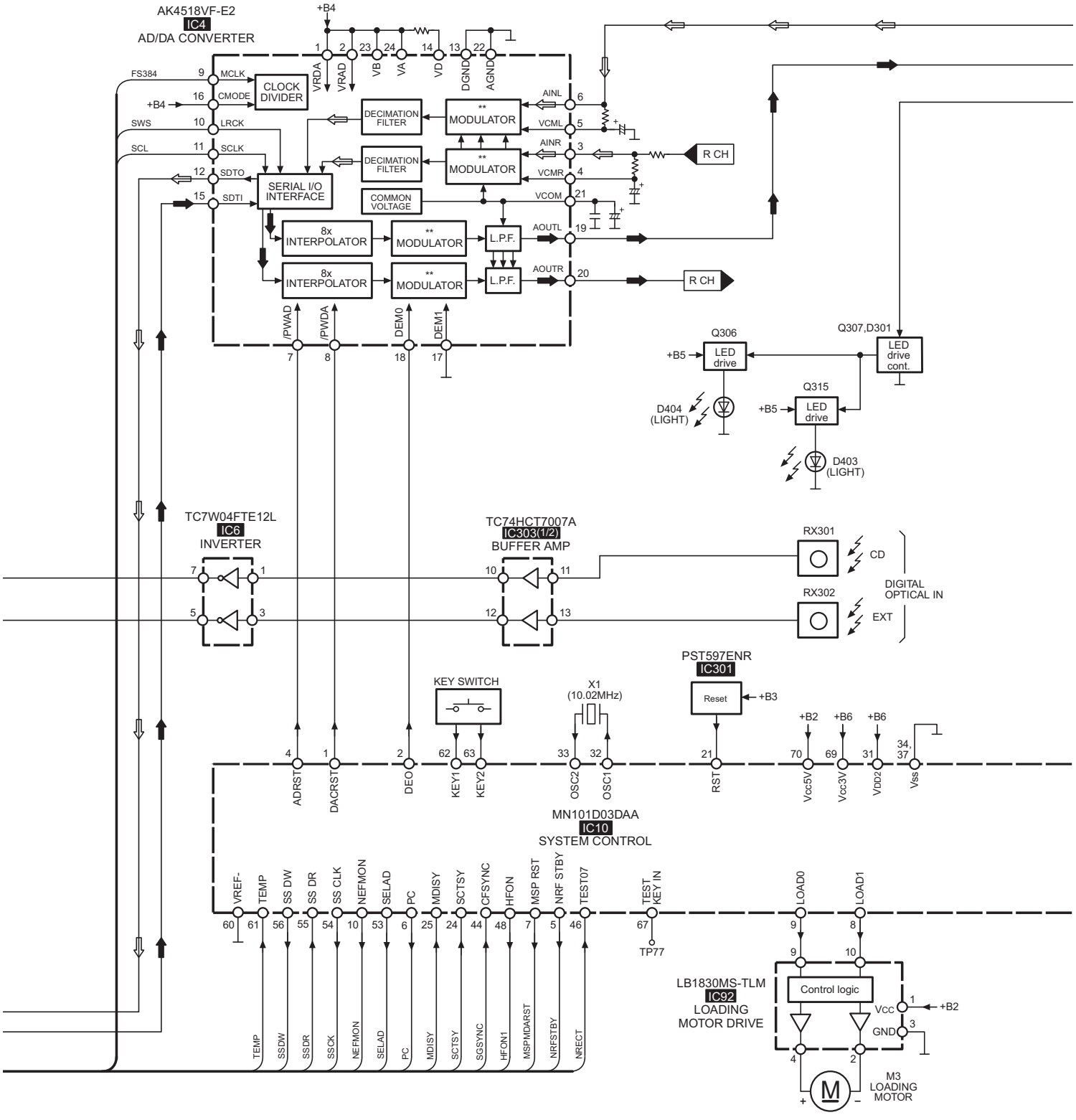


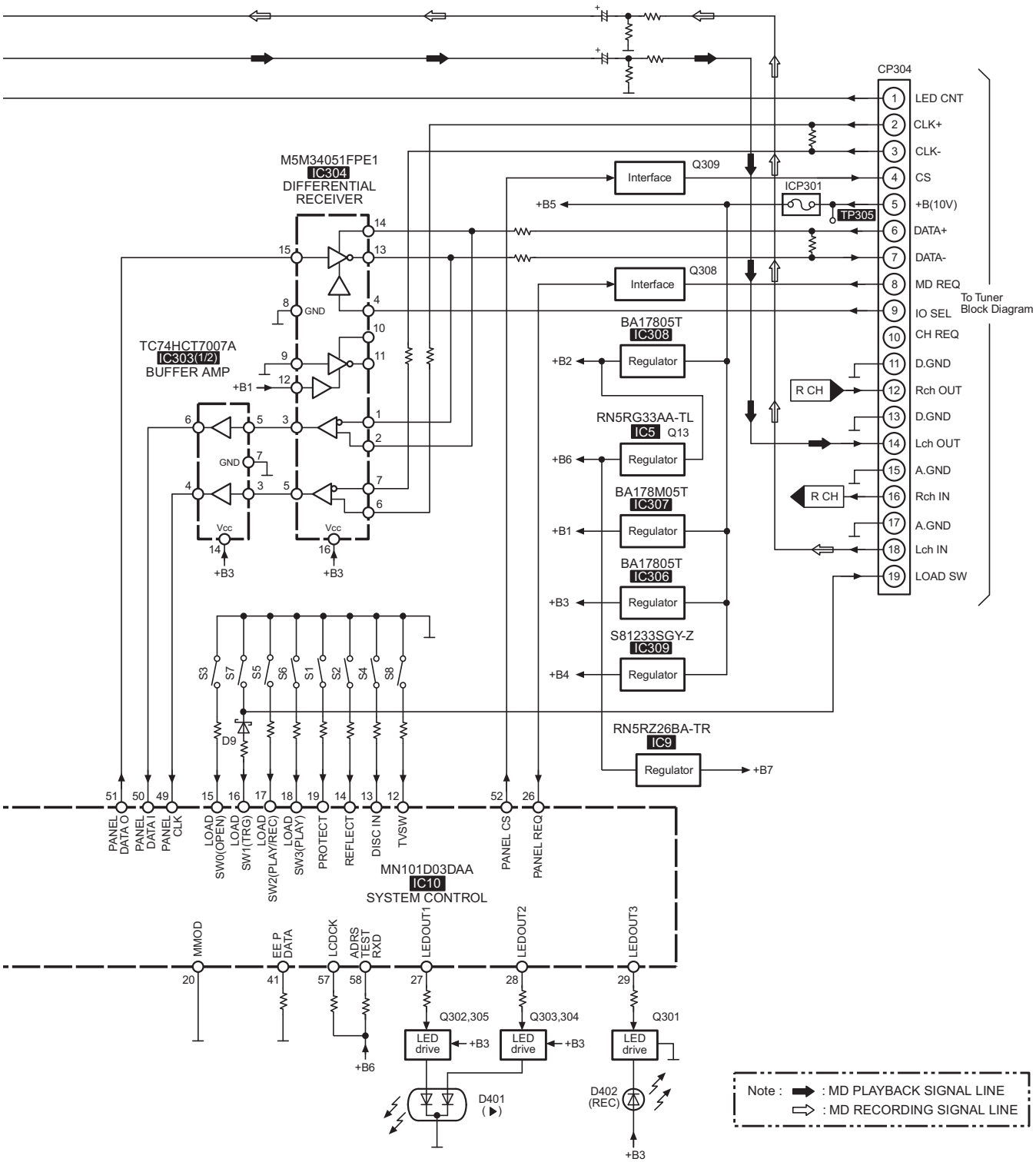
■ELECTRICAL PARTS LOCATION

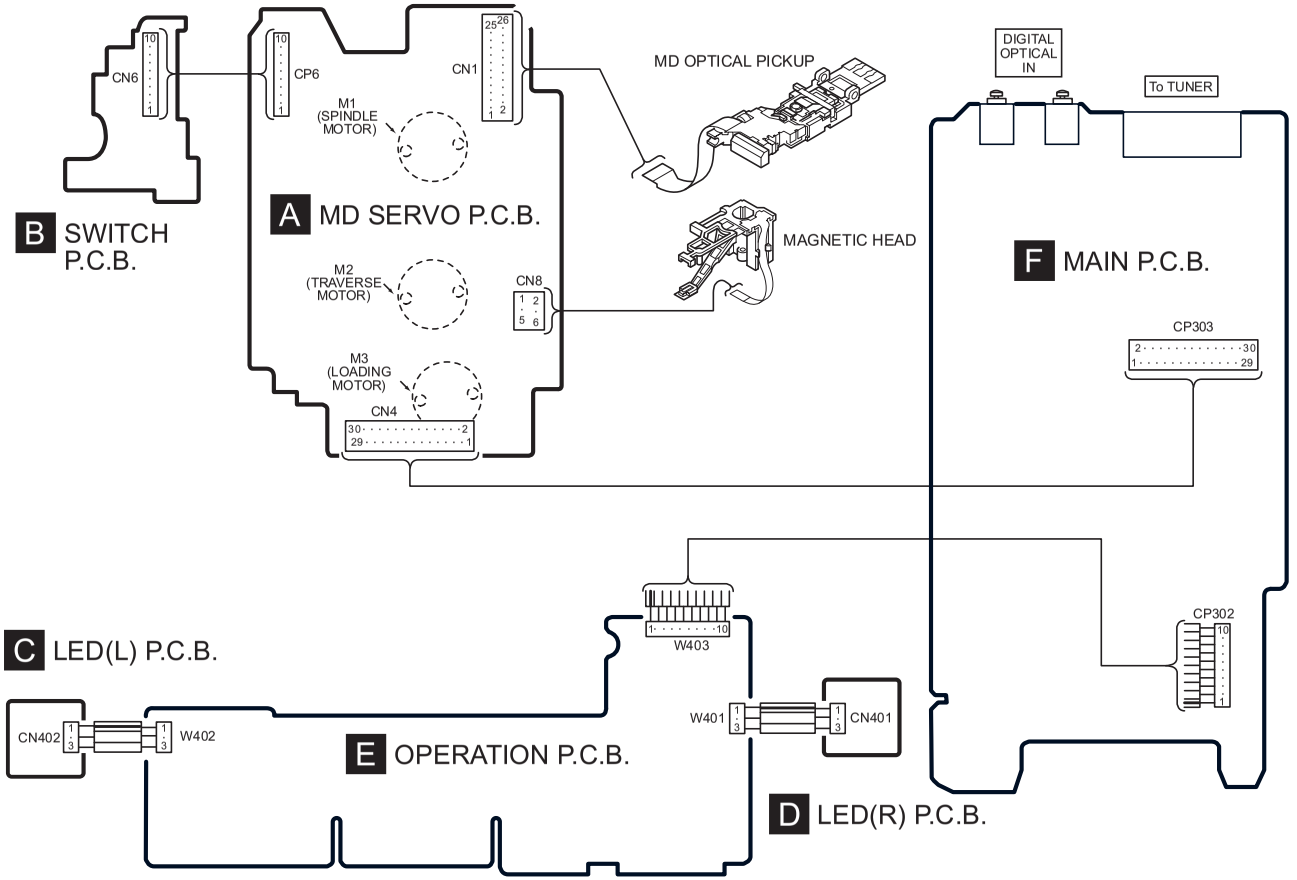
Ref. No.	Lo. No.	Ref. No.	Lo. No.
F MAIN P.C.B.			
IC301	5C	R331	7C
IC303	6C	R332	6B
IC304	6C	R333	7C
IC306	4B	R334	6C
IC307	3B	R335	6C
IC308	4B	R336	7C
IC309	5B	R338	6C
Q301	3C	R343	6C
Q302	2C	R344	3C
Q303	2C	R345	2C
Q304	3C	R346	2C
Q305	2C	R347	7D
Q306	3C	R348	7D
Q307	3C	R349	7D
Q308	6B	R350	7D
Q309	6B	R351	3C
Q315	3D	R352	6C
D301	3C	R353	6C
D302	7C	R354	6C
D303	7C	R355	6C
ICP301	5B	R360	5C
L301	7B	R362	3C
L303	7B	R365	6C
L304	7C	R367	5B
L305	7C	C311	6D
L307	7B	C312	6D
L308	7C	C314	7D
L309	7C	C315	7D
L310	7C	C317	4B
CP302	2D	C318	4B
CP303	5C	C319	3B
CP304	7C	C320	3B
E301	7C	C321	4B
RX301	7B	C322	4C
RX302	7B	C323	7C
TP301	7B	C324	5B
R301	3D	C325	5B
R306	2D	C327	6C
R309	2D	C328	7B
R315	3C	C329	7B
R316	3C	C331	6B
R317	6D	C351	6C
R318	6D	C352	6C
R319	7D	C353	5B
R320	7D	C355	5B
R321	7D	C356	5C
R322	7D	C357	7D
R323	6C	C358	7C
R324	6C	C361	5B
R326	6B	C362	7C
R327	6B	C363	7D
R328	6B	C364	7C
R329	6B	C365	7B
R330	7C	C366	5B


AN8772FHQ
IC1
RF AMP
MD OPTICAL PICKUP
SERIAL&PARALLEL CONV./GATE
SELECT SIGNAL
AGC
EQ
SW
DARK DET.
3T DET.
NRFDET
RF BDO
AS BDO
COMP
VCA
3 tap
4 tap
11 tap
FBAL
TBAL
B.P.F.
CLPF1
CLPF2
CENVC
Laser power drive
VR1 (LASER POWER ADJ.)
REC drive
Power supply
HFON
TH1
Tracking coil
Focus coil
M2 TRAVERSE MOTOR
M1 SPINDLE MOTOR
DIRECTION DET.
1/2 PVCC
VCC DET.
Power supply
AN8814SB-E1
IC2
FOCUS/TRACKING COIL,SPINDLE/TRAVERSE MOTOR DRIVE


L700
MAGNETIC
HEAD
Q10,11
Head
drive
TC74HCT00AFL
IC11
NAND GATE
NEFMON
MNV4400-T8T
IC72
4M DRAM
Vcc
13
+B6
Vss
26
D01~
04
A0~9
RAS
CAS
WE
1,2,
24,25
5,
9~12
14~18
4
23
3
MN66616RA1
IC3
ATRAC ENCODER/DECODER,
SERVO SIGNAL PROCESSOR
73
43~46
30~43
47
48
49
69
78~81
REFM
RD0~3
RA0~12
NRAS
NCAS
NWE
TX
TS0~3
DIGITAL
OUT
CHIP CONTROL
MONI0~3
74~
77
72
NREFM
97
PEFMS
EXTERNAL DRAM
CONTROL
NRST
50
MSPMDARST
APC GEN.
APCD
92
APCREF
NRECT
26
NRECT
SCTSY
56
SCTSY
MDISY
55
MDISY
REFM
94
REFM1
95
EFMIREF
+B7
96
EFMPLLF
EFMMOD/
EFMDEM/
EFMPLL
ECC SPM
CONTROL
ATRAC DIGITAL
SIGNAL
PROCESSOR
MICRO
COMPUTER
SERIAL
INTERFACE
SSCK
52
SSCK
SELAD
51
SELAD
SSDW
53
SSDW
SSDR
54
SSDR
SGSYNC
57
SGSYNC
ADIP
1
ADIP
ADIP DEM/FM DEM
SPON
22
SPON
TVON
23
TVON
APCREF
92
APCD
OFTR
91
OFTR
TRCRS
90
TRCRS
100
TEFSEL
25
FG
DIGITAL
SERVO
PROCESSOR
RFDAT
87
RFDAT
RFCK
88
RFCK
NRFLD
89
NRFLD
RFIC
SERIAL INTERFACE
SELECTOR
DIGITAL
IN
DIN PLL
RX1
70
RX2
71
FS
CONVERTER
X2
(16.9344MHz)
MASTER
PLL
CLOCK
GEN.
XO
85
XI
84
ASGAIN
14
ASGAIN
ABGAIN
15
ABGAIN
FBAL
11
FBAL
TOFS
10
TOFS
TBAL
12
TBAL
AMONI
8
AMONI
TGAIN
13
TGAIN
FOD
18
FOD
TRD
19
TRD
TVD
20
TVD
SPD
21
SPD
D/A
CONVERTER
CD & ADC/DAC INTERFACE
AVDD0,1
16,98
+B7
IVDD0,1
28,59
+B6
DVDD0~2
24,58,83
+B7
AVSS0,1
17,99
DVSS0,1
29,60
VREF
9
VREFI
A/D CONVERTER
AS
FE
TE
LNP
BAT
DRMONI
HFRP
SCTSY
MDISY
FS384
SCL
SWS
SDAP
SDAR
EXSYSCK
DATA
BCK
LRCK
5
3
4
2
7
6
56
55
61
62
63
64
65
82
68
67
66


AK4518VF-E2
IC4
AD/DA CONVERTER
+B4
CLOCK DIVIDER
SERIAL I/O INTERFACE
COMMON VOLTAGE
DECIMATION FILTER
MODULATOR
8x INTERPOLATOR
L.P.F.
R CH
Q306
Q307,D301
LED drive
LED drive cont.
Q315
D404 (LIGHT)
D403 (LIGHT)
TC7W04FTE12L
IC6
INVERTER
TC74HCT7007A
IC303(1/2)
BUFFER AMP
RX301
RX302
CD
EXT
DIGITAL OPTICAL IN
PST597ENR
IC301
Reset
KEY SWITCH
X1
(10.02MHz)
MN101D03DAA
IC10
SYSTEM CONTROL
TP77
LB1830MS-TLM
IC92
LOADING MOTOR DRIVE
Control logic
M3
LOADING MOTOR


CP304
1 LED CNT
2 CLK+
3 CLK-
4 CS
5 +B(10V)
6 DATA+
7 DATA-
8 MD REQ
9 IO SEL
10 CH REQ
11 D.GND
12 Rch OUT
13 D.GND
14 Lch OUT
15 A.GND
16 Rch IN
17 A.GND
18 Lch IN
19 LOAD SW
To Tuner Block Diagram
M5M34051FPE1
IC304
DIFFERENTIAL RECEIVER
TC74HCT7007A
IC303(1/2)
BUFFER AMP
Interface
Q309
Interface
Q308
ICP301
TP305
+B5
+B1
+B2
+B3
+B4
+B6
+B7
BA17805T
IC308
Regulator
RN5RG33AA-TL
IC5
Q13
Regulator
BA178M05T
IC307
Regulator
BA17805T
IC306
Regulator
S81233SGY-Z
IC309
Regulator
RN5RZ26BA-TR
IC9
Regulator
R CH
R CH
S3
S7
S5
S6
S1
S2
S4
S8
D9
PANEL DATA O
PANEL DATA I
PANEL CLK
LOAD SW0(OPEN)
LOAD SW1(TRG)
LOAD SW2(PLAY/REC)
LOAD SW3(PLAY)
PROTECT
REFLECT
DISC IN
TVSW
PANEL CS
PANEL REQ
MN101D03DAA
IC10
SYSTEM CONTROL
MMOD
EE P DATA
LCDCK
ADRS TEST RXD
LEDOUT1
LEDOUT2
LEDOUT3
Q302,305
Q303,304
Q301
LED drive
LED drive
LED drive
D401 (▶)
D402 (REC)
Note : ➡ : MD PLAYBACK SIGNAL LINE
⇨ : MD RECORDING SIGNAL LINE


CN6
CP6
CN1
M1
(SPINDLE
MOTOR)
MD OPTICAL PICKUP
DIGITAL
OPTICAL
IN
To TUNER
B SWITCH
P.C.B.
A MD SERVO P.C.B.
MAGNETIC HEAD
F MAIN P.C.B.
M2
(TRAVERSE
MOTOR)
CN8
CP303
M3
(LOADING
MOTOR)
CN4
C LED(L) P.C.B.
W403
CP302
CN402
W402
E OPERATION P.C.B.
W401
CN401
D LED(R) P.C.B.

Pin No.	Mark	I/O Division	Function
13	TGAIN	I	Tracking gain adjustment input terminal
14	LNP	O	Lens position signal output terminal
15	AB GAIN	I	APP compensation signal gain adjustment terminal
16	FE	O	Focus error signal output terminal
17	AS GAIN	I	AS gain adjustment terminal
18	FBAL	I	Focus ballance adjustment terminal
19	AS/ MON3T	O	AS/3TMON signal output terminal
20	CEA	I	3T envelope det. capacitor connection terminal
21	BDO/ TRCRS	O	BDO/Track cross signal output terminal
22	CBD O	O	BDO detection capacitor connection terminal
23	OFT O	O	Off track detection signal output terminal
24	GND	—	GND terminal
25	OFT IN	I	Off track detection signal input terminal
26	VCC	I	Power supply terminal (+ 3V)
27	NRFDET/ OFTR	O	NRFDET/off track signal output terminal
28	NRFLD	I	Serial command latch signal input terminal
29	RF DATA	I	Serial command data signal input terminal
30	RFCK	I	Serial command clock input terminal
31	NRFSTBY	I	Standby control signal input terminal
32	OUT RF	O	EFM signal output terminal
33	CRF AGC	—	RFAGC capacitor connection terminal
34	EQ IN	I	EQ input terminal
35	ARFO	O	RF amp. output terminal
36	SVREF	I	Reference voltage input terminal

Pin No.	Mark	I/O Division	Function
37	VREF	O	Reference voltage output terminal
38	RF1	I	RF1 signal input terminal
39	RF2	I	RF2 signal input terminal
40	F1	I	F1 signal input terminal
41	F2	I	F2 signal input terminal
42	CLPF1	—	APP compensation LPF capacitor connection terminal
43	CLPF2	—	RF equalizer adjustment resistor connection terminal
44 ~47	A ~D	I	Beam A~D signal input terminal
48	CENVC	—	Beam E signal detection capacitor connection terminal

16.2. IC2 (AN8814SB-E1) : FOCUS/TRACKING COIL, SPINDLE/ TRAVERSE MOTOR DRIVE

Pin No.	Mark	I/O Division	Function
1	REG B	—	3.3V external transistor control terminal (Not used, open)
2	REG M	—	3.3V regular output monitor terminal (Not used, connected to GND)
3	NC	—	Not used, open
4	OPO	O	Op-amp output terminal
5	OP-	O	Op-amp invert output terminal
6	OP+	O	Op-amp non-invert output terminal (Not used, connected to GND)
7	Vcc	I	Power supply terminal
8	1/2 PVcc2	O	1/2 PVcc output terminal 1 (Connected to GND through capacitor)
9	PVcc	I	Power supply terminal for driver
10	PGND2	—	GND terminal
11	VO4-	O	Tracking coil driver output terminal

Pin No.	Mark	I/O Division	Function
12	VO4+	O	Tracking coil driver output terminal
13	VO3-	O	Focus coil driver output terminal
14	VO3+	O	Focus coil driver output terminal
15	VO2-	O	Traverse motor drive output terminal
16	VO2+	O	Traverse motor drive output terminal
17	VO1-	O	Spindle motor drive output terminal
18	VO+	O	Spindle motor drive output terminal
19	PGND	—	GND terminal
20	PVcc1	I	Power supply terminal
21	1/2 PVcc	O	1/2 PVcc output terminal 1 (Connected to GND through capacitor)
22	VREF	I	Reference voltage input
23	IN1	I	Spindle motor drive input terminal
24	PC1	I	Power cut 1 input terminal
25	IN2	I	Traverse motor drive input terminal
26	PC2	I	Power cut 2 input terminal
27	IN3	I	Focus drive input terminal
28	IN4	I	Tracking drive input terminal

16.3. IC3 (M6616RA1) : ATRAC ENCORDER/DECORDER, SERVO SIGNAL PROCESSOR

Pin No.	Mark	I/O Division	Function
1	ADIP	I	ADIP FM signal input terminal
2	LNP	I	Lens position signal input terminal
3	FE	I	Focus error signal input terminal
4	TE	I	Tracking error signal input terminal
5	AS	I	AS signal input terminal
6	DRMONI	I	Drive voltage monitor input terminal
7	BAT	I	Battery power supply terminal
8	AMONI	—	Servo analog monitor signal output (Not used, poen)
9	VREFI	I	Reference voltage input terminal
10	TOFS	O	Tracking off-set adjustment output terminal
11	FBAL	O	Focus balance adjustment output terminal
12	TBAL	O	Tracking balance adjustment output terminal
13	TGAIN	O	TE error gain adjustment output terminal
14	ASGAIN	O	Main beam amp gain adjustment output terminal
15	ABGAIN	O	APP adjustment output terminal
16	$AV_{DD}1$	I	Power supply terminal
17	$AV_{SS}1$	—	GND terminal
18	FOD	O	Focus drive signal output terminal
19	TRD	O	Tracking drive signal output terminal
20	TVD	O	Traverse motor drive signal ouutput terminal
21	SPD	O	Spindle motor drive signal output terminal
22	SPON	O	Drive IC spindle ON signal output terminal
23	TVON	O	Drive IC traverse ON signal output terminal
24	$DV_{DD}0$	I	Power supply terminal

24	DV_{DD0}	I	Power supply terminal

Pin No.	Mark	I/O Division	Function
25	FG	I	FG input terminal
26	NRECT	O	Rec/Play switching signal output terminal
27	IVDD2	—	Power supply terminal for I/O pad
28	IVDD0	—	Power supply terminal for I/O pad
29	DVss0	—	GND terminal
30 ~32	RAD12 ~RAD10	—	DRAM address output terminal (Not used, open)
33 ~42	RAD9 ~RAD0	O	DRAM address output terminal
43 ~46	RDT3 ~RDT0	I/O	DRAM data input/output terminal
47	NRAS	O	DRAM row address strobe output terminal
48	NCAS	O	DRAM culum address strobe output terminal
49	NWE	O	DRAM write enable output terminal
50	NRST	I	Reset signal input terminal
51	SELAD	I	MSP/MDA,I/F address select input terminal (“H” Address)
52	SSCK	I	MSP/MDA,I/F clock input terminal
53	SSDW	I	MSP/MDA,I/F write data input terminal
54	SSDR	O	MSP/MDA,I/F read data output terminal
55	MDISY	O	Leader synchronous signal output
56	SCTSY	O	ADIP synchronous noise output terminal
57	SGSYNC	O	Frame synchronous signal output terminal
58	DVDD1	I	Power supply terminal
59	IVDD1	—	Power supply terminal for I/O pad
60	DVss1	—	GND terminal
61	FS384	O	384 Fs output terminal
62	SCL	O	Bit clock output terminal
63	SWS	O	Word clock output terminal
64	SDAP	O	Audio data output terminal
65	SDAR	I	Audio data input terminal

Pin No.	Mark	I/O Division	Function
66	LRCK	I	CD word clock input terminal (Connected to GND)
67	BCK	I	CD bit clock input terminal (Connected to GND)
68	DATA	I	CD data input terminal (Connected to GND)
69	TX	O	Digital audio interface signal output terminal (Not used, open)
70	RX1	I	Digital audio interface signal 1 input terminal
71	RX2	I	Digital audio interface signal 2 input terminal
72	NREFM	—	EFM modulation inverted output (Not used, open)
73	REFM	O	EFM modulation output terminal
74	MONI3	—	Monitor signal output (Not used, open)
75	MONI2	—	Monitor signal output (Not used, open)
76	MONI1	—	Monitor signal output (Not used, open)
77	MONI0	—	Monitor signal output (Not used, open)
78	TS3	—	Not used, connected to GND
79	TS2	—	Not used, connected to GND
80	TS1	—	Not used, connected to GND
81	TS0	—	Not used, connected to GND
82	EXSYSCK	—	External system clock input terminal (Not used, connected to GND)
83	DVDD	I	Power supply terminal
84	X1	I	Crystal oscillator input terminal (F=16.9344MHz)
85	X0	O	Crystal oscillator output terminal (F=16.9344MHz)
86	VDss2	—	GND terminal
87	RFDAT	O	RF serial data output terminal

Pin No.	Mark	I/O Division	Function
88	RFCK	O	RF serial clock output terminal
89	NRFLD	O	RF serial load output terminal
90	TRCRS	I	Track cross input terminal
91	OFTR	I	Off-track signal input terminal
92	APCD	O	Laser power PWM output terminal
93	EXEFMCK	I	External FM clock input terminal (Not used, connected to GND through registor)
94	PEFM1	O	EFM loop filter output terminal
95	EFMIREF	I	EFM PLL reference current input terminal
96	EFMPLLF	O	EFM PLL filter output terminal
97	PEEMS	I	EFM signal input terminal
98	$AV_{DD}0$	I	Power supply terminal
99	AVss0	—	GND terminal
100	TEFSEL	—	Not used, open

16.4. IC10 (MN101D03DAA) : SYSTEM CONTROL

Pin No.	Mark	I/O Division	Function
1	DACRST	O	DAC reset signal output terminal to IC4 (“L”:Reset)
2	DEO	O	DE emphasis signal output terminal to IC4(“L”:DE emphases)
3	MUTE	—	AD-DA mute output terminal (Not used, open)
4	AD RST	O	Reset signal output terminal
5	NRFSTBY	O	Standby control signal output terminal (“L”: Standby)
6	PC	O	Transistor drive signal output terminal (“H”:Power ON)
7	MSP RST	O	MSP reset signal output terminal (“L”:Reset)

Pin No.	Mark	I/O Division	Function
8	LOAD1	O	Loading motor drive 1 output terminal
9	LOAD0	O	Loading motor drive 0 output terminal
10	NEFMON	O	Magnetic head current output terminal
11	TEST01	O	Test signal output terminal (Not used, open)
12	TVSW	I	Traverse innermost detection switch signal input terminal
13	DISC IN	I	Disc detection switch signal input terminal
14	REFLECT	I	Reflection rate switch signal input terminal
15	LOAD SW0 (OPEN)	I	Loading mechanism position det. Switch 0 signal input terminal
16	LOAD SW1 (TRG)	I	Loading mechanism position det. Switch 1 signal input terminal
17	LOAD SW2 (PLAY/ REC)	I	Loading mechanism position det. Switch 2 signal input terminal.
18	LOAD SW3 (PLAY)	I	Loading mechanism position det. Switch 3 signal input terminal
19	PROTECT	I	Erase prevention switch signal input terminal
20	MMOD	—	Connected to GND
21	RST	I	Reset signal input terminal (“L”:Reset)
22	UNIT TEST	I	Test signal input terminal (Open)
23	CS2	I	Test signal input terminal (Open)
24	SCTSY	I	Micro computer interrupt signal input terminal (SUBQ /ADIP simultaneous signal)
25	MDISY	I	Micro computer interrupt signal input terminal (MD simultaneous signal)
26	PANEL REQ	I	Panel I/F request signal input terminal

Pin No.	Mark	I/O Division	Function
27 ~29	LED OUT1 ~LED OUT3	O	Drive signal output terminal to LED DRIVE (“H” :LED ON)
30	TEST02	O	Test signal output terminal (Not used, open)
31	V_{DD}2(3V)	I	Power supply terminal (+ 3V)
32	OSC1	I	Crystal oscillator input terminal (f=10.02MHz)
33	OSC2	O	Crystal oscillator output terminal (f=10.02MHz)
34	V_{SS}	—	GND terminal
35	X1	I	Not used, connected to GND
36	X0	O	Not used, open
37	VSS	—	GND terminal
38	TEST03	O	Test signal output terminal (Not used, open)
39	EEPCS	O	EEPROM chip select signal output terminal (Not used, open)
40	EEPCK	O	EEPROM clock signal output terminal (Not used, open)
41	EEPDATA	I/O	EEPROM data in/output terminal (Connected to GND through resistor)
42	TEST04	O	Test signal output terminal (Not used, open)
43	TEST05		
44	CFSYNC	I	ATRACK management frame simultaneous signal input terminal
45	TEST06	O	Test signal output terminal (Not used, open)
46	TEST07	I	Connected to rec/play switch signal
47	TOK OK	O	Not used, open
48	HF ON	—	Drive signal output terminal to Q3 (POWER SUPPLY CONTROL)
49	PANEL CLK	I	Panel I/F clock input terminal
50	PANEL DATA I	I	Panel I/F data input terminal

Pin No.	Mark	I/O Division	Function
51	PANEL DATA 0	O	Panel I/F data output terminal
52	PANEL CS	O	Panel I/F chip select output terminal
53	SELAD	O	Micro computer I/F address select output terminal
54	SSCLK	O	Micro computer I/F clock output terminal
55	SSDR	I	Micro computer I/F reading data input terminal
56	SSDW	O	Micro computer I/F writing data output terminal
57	LCDCK	O	LCD clock test signal output terminal (Connected to power supply through resistor)
58	ADRS TEST RXD	O	Test signal output terminal (Connected to power supply through resistor)
59	LCD DATA TXD	O	Test signal output terminal (Not used, open)
60	VREF-	—	Connected to GND
61	TEMP	I	Temprature sensor amp input terminal
62	KEY1	I	Key input 1 terminal
63	KEY2	I	Key input 2 terminal
64	MO LOAD	I	Test signal input terminal (“L”:Without loading mechanism) (Open)
65	SRVTEST	I	Test signal input terminal (“L”:Servo test mode) (Open)
66	LOAD P	I	Test signal input terminal (Open)
67	TEST KEY IN	I	Test signal input terminal (“L”:Unit key mode) (Open)
68	SRV LOAD	I	Test signal input terminal (“L”:Using for servo primary values EEPROM)
69	VCC 3V	I	Power supply terminal (+ 3V)
70	VCC 5V	I	Power supply terminal (+ 5V)

Pin No.	Mark	I/O Division	Function
71	SELADDA	I	AD/DA converter select signal input terminal (Open)
72	SLOCK	O	Spindle lock test signal output terminal (Not used, open)
73	TLOCK	O	Tracking lock signal output terminal (“H”:lock) (Not used, open)
74	FLOCK	O	Focus lock test signal output terminal (“H”:lock) (Not used, open)
75	ERROR	O	Servo error test signal output terminal (Not used, open)
76	BUSY	O	Servo busy test signal output terminal (Not used, open)
77	SBPRETRY	O	Signal management retry test signal output terminal (Not used, open)
78	SRVRETRY	O	Servo retry test signal output terminal (Not used, open)
79	ARDSKIP	O	Address skip test signal output terminal (Not used, open)
80	SPMWE	O	SPM take in test signal output terminal

16.5. IC72 (MNV4400-T8T) : 4M DRAM

Pin No.	Mark	I/O Division	Function
1	DO1	I/O	DRAM data 1 in/output terminal
2	DO2	I/O	DRAM data 2 in/output terminal
3	WE	I	DRAM light enable input terminal
4	RAS	I	DRAM low address strobe input terminal
5	A9	I	DRAM address 9 input terminal
9	A0	I	DRAM address 0 input terminal
10 ~12	A1 ~A3	I	DRAM address 1~3 input terminal
13	VCC	I	Power supply terminal
14 ~18	A4 ~A8	I	DRAM address 4~8 input terminal
22	OE	I	DRAM output enable input terminal (Not used, connected to GND)
23	CAS	I	DRAM calam address strobe input terminal
24	DO3	I/O	DRAM data 3 in/output terminal
25	DO4	I/O	DRAM data 4 in/output terminal
26	VSS	—	GND terminal

17. Replacement Parts List

17.1. Replacement Parts List

Notes:
***Important safety notice: / Components identified by ⚠ mark have special characteristics important for safety. / Funrthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. / When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list. / *Warning: This product uses a laser diode. Refer to caution statements. / *ACHTUNG: Die lasereinheit nicht zerlegen.Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden. / *Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F) / *Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM), 1M=1,000K (OHM) / *The marking <RTL> indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly , and in accordance with the laws governing**

part and product retention. After the end of this period, the assembly will no longer be available.

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
1	RHD30007-S	SCREW	4	
2	RGK0972-1S	SIDE PANEL(L)	1	
3	RGL0394-Q	PANEL LIGHT(L)	1	
4	XTBS26+8J	SCREW	2	
5	RGK0973-1S	SIDE PANEL(R)	1	
6	RGL0395-Q	PANEL LIGHT(R)	1	
7	XTBS3+8JFZ1	SCREW	13	
8	REZ1048	FFC(30P)	1	
9	RKA0098-K	FOOT	4	
10	RKM0364-1S	CABINET	1	
11	REP2683B-S	LED(L R) P.C.B.	1	
12	RGG0148A-1S	FRONT PANEL	1	
13	RGK0977-2S	MD LID	1	
14	RGL0386-Q	PANEL LIGHT(PLAY)	1	
15	RGL0387-Q	PANEL LIGHT(REC)	1	
16	RGP0642-1S	SUB PANEL	1	
17	RGU1599A-1S	OPERATION BUTTON	1	
18	RHD20010	SCREW	1	
19	RMB0514	SPRING	1	
20	XTB3+5JFZ	SCREW	4	
21	RQLS0104	LASER CAUTION LABEL	1	
22	XTB26+8J	SCREW	4	
100	RED0047-1	MAGNETIC HEAD	1	
101	RHD17021	SCREW	1	
102	RHD17022	SCREW	1	
103	RMC0348	THRUST SPRING	1	
104	RMC0349	NUT PLATE SPRING	1	
105	RML0515	SHIFTER	1	
106	RMQ0750	REF BASE	1	
107	RMQ0751	NUT PLATE	1	
108	RMS0611	MAIN SHAFT	1	
109	RXJ0021	DRIVE SHAFT	1	
110	RXK0249	MECHANISM CHASSIS	1	
110-1	RDV0055	BELT	1	
110-2	REM0077	TRAVERSE MOTOR	1	
110-3	REM0078	LOADING MOTOR	1	
110-4	RMB0548	PRESSURE SPRING	1	
110-5	RMQ0752	DETECTOR PIN(1)	1	
110-6	RMQ0753	DETECTOR PIN(2)	2	
110-7	XQN17+C25FZ	SCREW	4	
110-8	XYC2+FF105	SCREW	1	
111 ⚠	RAF1700A	OPTICAL PICKUP	1	
112	XTW2+6S	SCREW	1	
113	RHD20053	SCREEW	4	
114	RMB0504	SPRING	4	
115	RMG0447-K	DUMPER	4	
116	XTN17+6GFZ	SCREW	1	
117	RXQ0558	HOLDER ASS'Y	1	
C1	ECUV1H221KBV	50V 220P	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
C4	ECUV0J105ZFV	6.3V 1U	1	
C5	ECUVNA224KBV	10V 0.22U	1	
C6	ECUV0J105ZFV	6.3V 1U	1	
C7,8	ECUVNA224KBV	10V 0.22U	2	
C11	ECUV1C223KBV	16V 0.022U	1	
C12	ECUV0J474KBV	6.3V 0.47U	1	
C13	ECUV1C393KBV	16V 0.039U	1	
C14	ECUV1H102KBV	50V 1000P	1	
C15	ECST0GY106RR	4V 10U	1	
C16	ECUV1H181KV	50V 180P	1	
C17	ECUV1H332KBV	50V 3300P	1	
C18	ECUV1H562KBV	50V 5600P	1	
C19	ECUVNC104ZFV	16V 0.1U	1	
C20	ECST0GY106RR	4V 10U	1	
C21	ECUV1H822KBV	50V 8200P	1	
C22	ECUV1H102KBV	50V 1000P	1	
C23	ECUVNC104ZFV	16V 0.1U	1	
C24	ECUV1H102KBV	50V 1000P	1	
C25	ECUV1C393KBV	16V 0.039U	1	
C26	ECUV1H472KBV	16V 4700P	1	
C28	ECST0GY226RR	4V 22U	1	
C29	ECUV1H332KBV	50V 3300P	1	
C30	ECUV1E123KBV	25V 0.012U	1	
C31	ECUV1H102KBV	50V 1000P	1	
C32	ECUV1H102KBV	50V 1000P	1	
C33	ECST0GY106RR	4V 10U	1	
C34	ECUV1H102KBV	50V 1000P	1	
C35	ECUV1H102KBV	50V 1000P	1	
C37	ECUV1H181KV	50V 180P	1	
C40	ECUVNC104ZFV	16V 0.1U	1	
C41	ECEV0JA331P	6.3V 330U	1	
C42	ECST0GY106RR	4V 10U	1	
C45	ECST0GY106RR	4V 10U	1	
C46	ECUVNC104ZFV	16V 0.1U	1	
C47	ECUV0J105ZFV	6.3V 1U	1	
C48	ECUVNC104ZFV	16V 0.1U	1	
C50	ECUVNC104ZFV	16V 0.1U	1	
C51,52	ECUV0J105ZFV	6.3V 1U	2	
C53	ECUV1H332KBV	50V 3300P	1	
C55-57	ECUV1H102KBV	50V 1000P	3	
C58	ECUV1H102KBV	50V 1000P	1	
C59	ECUV1C823KBV	16V 0.082U	1	
C60	ECEV1CA100NR	16V 10U	1	
C61	ECUV0J334KBV	16V 0.33U	1	
C62	ECUV1H221KBV	50V 220P	1	
C64	ECUV1E153KBV	25V 0.015U	1	
C65	ECUV1C104KBV	16V 0.1U	1	
C66	ECUV1C823KBV	16V 0.082U	1	
C67	ECUV1H392KBV	50V 3900P	1	
C70	ECUV1E123KBV	25V 0.012U	1	
C71	ECUVNC104ZFV	16V 0.1U	1	
C72	ECUVNC104ZFV	16V 0.1U	1	
C73-76	ECUVNC104ZFV	16V 0.1U	4	
C79	ECUVNC104ZFV	16V 0.1U	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
C80	ECUVNC104ZFV	16V 0.1U	1	
C81	ECUV1H560JCV	50V 56P	1	
C82	ECUV1C473KBV	16V 0.047U	1	
C83,84	ECUVNC104ZFV	16V 0.1U	2	
C85	ECST0GY106RR	4V 10U	1	
C86	ECUV1E153KBV	25V 0.015U	1	
C87	ECUVNC104ZFV	16V 0.1U	1	
C88,89	ECUV1H331KBV	50V 330P	2	
C90,91	ECUV1H080DCV	50V 8P	2	
C92	ECUVNC104ZFV	16V 0.1U	1	
C93	ECUVNC104ZFV	16V 0.1U	1	
C94	ECST0GY475RR	4V 4.7U	1	
C95	ECUVNC104ZFV	16V 0.1U	1	
C96,97	ECST0GY475RR	4V 4.7U	2	
C98	ECUVNC104ZFV	16V 0.1U	1	
C99	ECUV1H102KBV	50V 1000P	1	
C100	ECUVNC104ZFV	16V 0.1U	1	
C101	ECST0GY106RR	4V 10U	1	
C102	ECUVNC104ZFV	16V 0.1U	1	
C103	ECST0GY106RR	4V 10U	1	
C106	ECUV1H102KBV	50V 1000P	1	
C110	ECUVNC104ZFV	16V 0.1U	1	
C111	ECST0GY106RR	4V 10U	1	
C112	ECEV1CA100NR	16V 10U	1	
C113	ECUVNC104ZFV	16V 0.1U	1	
C114,15	ECUV1H561KBV	50V 560P	2	
C117	ECEV0JA331P	6.3V 330U	1	
C118	ECUVNA105KBN	10V 1U	1	
C119	ECUV1H102KBV	50V 1000P	1	
C120	ECUV1H560JCV	50V 56P	1	
C121	ECUV1H102KBV	50V 1000P	1	
C122	ECUV0J105ZFV	6.3V 1U	1	
C123,24	ECUVNC104ZFV	16V 0.1U	2	
C128	ECUVNC104ZFV	16V 0.1U	1	
C129	ECUV1H101JCV	50V 100P	1	
C133	ECUV0J105ZFV	6.3V 1U	1	
C134	ECUV1H331KBV	50V 330P	1	
C138	ECEV0JA470SR	6.3V 47U	1	
C139,40	ECUVNC104ZFV	16V 0.1U	2	
C141	ECUVNC104ZFV	16V 0.1U	1	
C142	ECUVNC104ZFV	16V 0.1U	1	
C143	ECST0GY106RR	4V 10U	1	
C144	ECUV1E103KBV	25V 0.01U	1	
C147-49	ECUV1E103KBV	25V 0.01U	3	
C154,55	ECUV1H330JCV	50V 33P	2	
C311,12	RCE1CKA470BG	16V 47U	2	
C314,15	ECUV1H222KBN	50V 2200P	2	
C317	ECUVNE104ZFN	25V 0.1U	1	
C318	ECEA0JKS101	6.3V 100U	1	
C319	ECUVNE104ZFN	25V 0.1U	1	
C320	ECEA0JKS101	6.3V 100U	1	
C321	ECUVNE104ZFN	25V 0.1U	1	
C322	ECEA0JKS101	6.3V 100U	1	
C323,24	ECUVNE104ZFN	25V 0.1U	2	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
C325	ECA1CM222	16V 2200U	1	
C327-29	ECUVNE104ZFN	25V 0.1U	3	
C331	ECUVNE104ZFN	25V 0.1U	1	
C351,52	ECEA1CKS220	16V 22U	2	
C353	ECUVNE104ZFN	25V 0.1U	1	
C355	ECEA1AKS221	6.3V 220U	1	
C356	ECUV1H101JCN	50V 100P	1	
C357,58	ECUVNE104ZFN	25V 0.1U	2	
C361-64	ECUVNE104ZFN	25V 0.1U	4	
C365	ECUVNC105ZFN	16V 1U	1	
C366	ECEA0JKS101	6.3V 100U	1	
C401,02	ECUV1H103KBN	50V 0.01U	2	
CN1	RJS2A4526T	CONNECTOR(26P)	1	
CN4	RJS2A4830T	CONNECTOR(30P)	1	
CN6	RJU113W10M	SOCKET(10P)	1	
CN8	RJS2A4506T	CONNECTOR(6P)	1	
CP6	RJT113W10M	CONNECTOR(10P)	1	
CP302	RJS10T6ZA	CONNECTOR(10P)	1	
CP303	RJS2A3330	CONNECTOR(30P)	1	
CP304	RJT065A19	AB CONNECTOR(19P)	1	
D5,6	SC80209TE12R	DIODE	2	
D9	MA728TX	DIODE	1	
D301	MA4033M	DIODE	1	
D302,03	MA719TA	DIODE	2	
D401	SML79420C	LED	1	
D402	LNJ201LPQJA	LED	1	
IC1	AN8772FHQ	IC	1	
IC2	AN8814SB-E1	IC	1	
IC3	MN66616RA1	IC	1	
IC4	AK4518VF-E2	IC	1	
IC5 ⚠	RN5RG33AA-TL	IC	1	
IC6	TC7W04FTE12L	IC	1	
IC9 ⚠	RN5RZ26BA-TR	IC	1	
IC10	MN101D03DAA	IC	1	
IC11	TC74HCT00AFL	IC	1	
IC72	MNV4400-T8T	IC	1	
IC92	LB1830MS-TLM	IC	1	
IC301	PST597ENR	IC	1	
IC303	TC74HCT7007A	IC	1	
IC304	M5M34051FPE1	IC	1	
IC306 ⚠	BA17805T	IC	1	
IC307 ⚠	BA178M05T	IC	1	
IC308 ⚠	BA17805T	IC	1	
IC309 ⚠	S81233SGY-Z	IC	1	
ICP301 ⚠	SRUN20T	IC PROTECTOR	1	
L1	RLQU100KT-W	COIL	1	

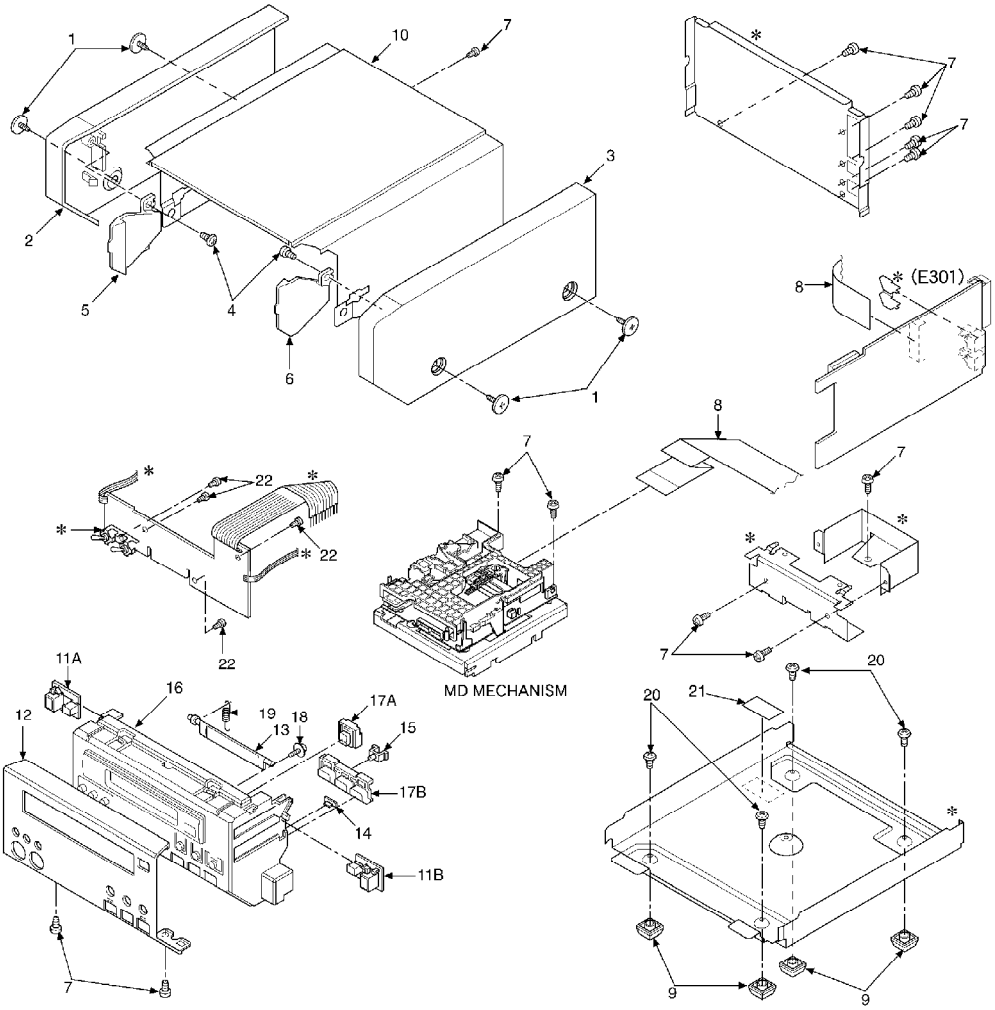
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
L2	RLQU101KT-W	COIL	1	
L3	RLQU101KT-W	COIL	1	
L4	RLQU2R2MT-W	COIL	1	
L5	RLQU2R2MT-W	COIL	1	
L6-8	RLQU2R2MT-W	COIL	3	
L9-12	RLQU100KT-W	COIL	4	
L13,14	RLQU2R2MT-W	COIL	2	
L15	RLQU100KT-W	COIL	1	
L16	RLQU2R2MT-W	COIL	1	
L17,18	RLQP1R8KT2-Y	COIL	2	
L301	RLQZB470KT-D	COIL	1	
L303-05	RLQZP1R0KT-Y	COIL	3	
L307-10	RLQZP1R0KT-Y	COIL	4	
PCB1	REP2775AA-S	MAIN P.C.B.	1	(RTL)
PCB2	REP2575A	SW P.C.B.	1	(RTL)
PCB3	REP2761A-T	SERVO P.C.B.	1	(RTL)
PCB4	REP2775AB-S	PANEL P.C.B.	1	(RTL)
Q1	2SB1295-6-TB	TRANSISTOR	1	
Q2	DTC114YETL	TRANSISTOR	1	
Q3	2SB1462STX	TRANSISTOR	1	
Q5	2SB1295-6-TB	TRANSISTOR	1	
Q6	DTC114YETL	TRANSISTOR	1	
Q10	2SJ278MYTR	FET	1	
Q11	2SK1764KYTR	FET	1	
Q13 ⚠	2SB1121ST-TD	TRANSISTOR	1	
Q301	UN5214TX	TRANSISTOR	1	
Q302,03	DTA114YUA106	TRANSISTOR	2	
Q304,05	UN5214TX	TRANSISTOR	2	
Q306	2SB709ATX	TRANSISTOR	1	
Q307	UN5214TX	TRANSISTOR	1	
Q308	UN5111TX	TRANSISTOR	1	
Q309	UN5214TX	TRANSISTOR	1	
Q315	2SB709ATX	TRANSISTOR	1	
R1	ERJ3GEYJ472V	1/16W 4.7K	1	
R2	ERJ3GEYJ102Z	1/16W 1K	1	
R3	ERJ3GEYJ472V	1/16W 4.7K	1	
R5	ERJ3GEYJ1R0V	1/16W 1	1	
R6	ERJ3GEYJ472V	1/16W 4.7K	1	
R8	ERJ3GEYJ271V	1/16W 270	1	
R10	ERJ3GEYJ474V	1/16W 470K	1	
R11	ERJ3GEYJ101V	1/16W 100	1	
R12	ERJ3GEYJ223V	1/16W 22K	1	
R13	ERJ6GEYJ3R3V	1/8W 3.3	1	
R14	ERJ3GEYD103V	1/16W 10K	1	
R15	ERJ3GEYJ223V	1/16W 22K	1	
R16	ERJ3GEYJ104Z	1/16W 100K	1	
R17	ERJ3GEYJ223V	1/16W 22K	1	
R18	ERJ3GEYJ103Z	1/16W 10K	1	
R19	ERJ3GEYJ102Z	1/16W 1K	1	
R20	ERJ3GEYJ473V	1/16W 47K	1	
R21	ERJ3GEYJ223V	1/16W 22K	1	
R22	ERJ3GEY0R00V	CHIP JUMPER	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R23	ERJ3GEYJ272V	1/16W 2.7K	1	
R24	ERJ3GEYJ473V	1/16W 47K	1	
R25	ERJ3GEYJ104Z	1/16W 100K	1	
R26	ERJ3GEYJ473V	1/16W 47K	1	
R28,29	ERJ3GEYJ473V	1/16W 47K	2	
R30	ERJ3GEYJ102Z	1/16W 1K	1	
R31	ERJ3GEYJ223V	1/16W 22K	1	
R32	ERJ3GEYJ473V	1/16W 47K	1	
R34	ERJ3GEYJ272V	1/16W 2.7K	1	
R35	ERJ3GEYJ183V	1/16W 18K	1	
R36	ERJ3GEYJ273V	1/16W 27K	1	
R37	ERJ3GEYJ333V	1/16W 33K	1	
R38	ERJ3GEYJ223V	1/16W 22K	1	
R42	ERJ3GEYJ102Z	1/16W 1K	1	
R43	ERJ3GEYJ222V	1/16W 2.2K	1	
R44	ERJ3GEYJ223V	1/16W 22K	1	
R45	ERJ3GEYJ333V	1/16W 33K	1	
R46	ERJ3GEYJ222V	1/16W 2.2K	1	
R47	ERJ3GEYJ473V	1/16W 47K	1	
R50	ERJ3GEYJ102Z	1/16W 1K	1	
R55	ERJ3GEYJ332V	1/16W 3.3K	1	
R56	ERJ3GEYJ223V	1/16W 22K	1	
R58	ERJ3GEYJ682V	1/16W 6.8K	1	
R59	ERJ3GEYJ683V	1/16W 68K	1	
R60	ERJ3GEYJ332V	1/16W 3.3K	1	
R61,62	ERJ3GEYJ223V	1/16W 22K	2	
R63	ERJ3GEYJ103Z	1/16W 10K	1	
R64-66	ERJ3GEYJ471V	1/16W 470	3	
R67	ERJ3GEYJ102Z	1/16W 1K	1	
R70	ERJ3GEYJ102Z	1/16W 1K	1	
R71,72	ERJ3GEYJ220V	1/16W 22	2	
R73	ERJ3GEYJ393V	1/16W 39K	1	
R74	ERJ3GEYJ822V	1/16W 8.2K	1	
R75	ERJ3GEYJ223V	1/16W 22K	1	
R76	ERJ3GEYJ100V	1/16W 10	1	
R77	ERJ3GEYJ223V	1/16W 22K	1	
R78-80	ERJ3GEYJ102Z	1/16W 1K	3	
R81	ERJ3GEYJ223V	1/16W 22K	1	
R82	ERJ3GEYJ473V	1/16W 47K	1	
R83	ERJ3GEYJ105V	1/16W 1M	1	
R84	ERJ3GEYJ153V	1/16W 15K	1	
R85	ERJ3GEYJ223V	1/16W 22K	1	
R86,87	ERJ3GEYJ102Z	1/16W 1K	2	
R89,90	ERJ3GEYJ102Z	1/16W 1K	2	
R93	ERJ3GEYJ102Z	1/16W 1K	1	
R95	ERJ3GEYJ222V	1/16W 2.2K	1	
R98,99	ERJ3GEYJ102Z	1/16W 1K	2	
R100	ERJ3GEYJ473V	1/16W 47K	1	
R103	ERJ3GEYJ102Z	1/16W 1K	1	
R104,05	ERJ3GEYJ272V	1/16W 2.7K	2	
R107-09	ERJ3GEYJ102Z	1/16W 1K	3	
R110	ERJ3GEYJ102Z	1/16W 1K	1	
R111,12	ERJ3GEYJ221V	1/16W 220	2	
R114,15	ERJ3GEYJ103Z	1/16W 10K	2	

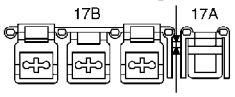
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R116	ERJ3GEYJ101V	1/16W 100	1	
R117	ERJ3GEYJ101V	1/16W 100	1	
R118	ERJ3GEYJ102Z	1/16W 1K	1	
R119,20	ERJ3GEYJ101V	1/16W 100	2	
R121,22	ERJ3GEYJ272V	1/16W 2.7K	2	
R123	ERJ3GEYJ102Z	1/16W 1K	1	
R124	ERJ3GEYJ473V	1/16W 47K	1	
R125	ERJ3GEYJ473V	1/16W 47K	1	
R130	ERJ3GEYJ272V	1/16W 2.7K	1	
R131	ERJ3GEYJ101V	1/16W 100	1	
R132	ERJ3GEYJ272V	1/16W 2.7K	1	
R134,35	ERJ3GEYJ272V	1/16W 2.7K	2	
R137	ERJ3GEYJ103Z	1/16W 10K	1	
R145,46	ERJ3GEYJ221V	1/16W 220	2	
R147	ERJ3GEYJ102Z	1/16W 1K	1	
R174	ERJ3GEYJ103Z	1/16W 10K	1	
R301	ERJ6GEYJ331V	1/10W 330	1	
R306	ERJ6GEYJ181V	1/19W 180	1	
R309	ERJ6GEYJ181V	1/19W 180	1	
R315	ERJ6GEYJ182V	1/10W 1.8K	1	
R316	ERDS2FJ151	1/4W 150	1	
R317,18	ERJ6GEYJ154V	1/10W 150K	2	
R319,20	ERJ6GEYJ681V	1/10W 680	2	
R321,22	ERDS2FJ100	1/4W 10	2	
R323,24	ERJ6GEYJ391V	1/10W 390	2	
R326	ERJ6GEYJ472V	1/10W 4.7K	1	
R327	ERJ6GEYJ103V	1/10W 10K	1	
R328	ERJ6GEYJ102Z	1/10W 1K	1	
R329	ERJ6GEYJ101V	1/10W 100	1	
R330,31	ERJ6GEYJ102Z	1/10W 1K	2	
R332	ERJ6GEYJ103V	1/10W 10K	1	
R333	ERJ6GEYJ561V	1/10W 560	1	
R334,35	ERJ6GEYJ102Z	1/10W 1K	2	
R336	ERJ6GEYJ561V	1/10W 560	1	
R338	ERJ6GEYJ101V	1/10W 100	1	
R343	ERDS2FJ101	1/4W 100	1	
R344	ERJ6GEYJ102Z	1/10W 1K	1	
R345,46	ERJ6GEYJ101V	1/10W 100	2	
R347,48	ERJ6GEYJ822V	1/10W 8.2K	2	
R349,50	ERJ6GEYJ272V	1/10W 2.7K	2	
R351	ERJ6GEYJ101V	1/10W 100	1	
R352,53	ERJ6GEYJ102Z	1/10W 1K	2	
R354,55	ERJ6GEYJ152V	1/10W 1.5K	2	
R360	ERJ6GEYJ472V	1/10W 4.7K	1	
R362	ERDS2FJ151	1/4W 150	1	
R365	ERJ6GEYJ561V	1/10W 560	1	
R367	ERJ6GEYJ101V	1/10W 100	1	
R401,02	ERJ6GEYJ122V	1/10W 1.2K	2	
R403,04	ERJ6GEYJ152V	1/10W 1.5K	2	
R405,06	ERJ6GEYJ222V	1/10W 2.2K	2	
R407,08	ERJ6GEYJ332V	1/10W 3.3K	2	
R409,10	ERJ6GEYJ472V	1/10W 4.7K	2	
R411	ERJ6GEYJ473V	1/10W 47K	1	
R412	ERJ6GEYJ822V	1/10W 8.2K	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R413	ERJ6GEYJ153V	1/10W 15K	1	
R414	ERJ6GEYJ473V	1/10W 47K	1	
R415	ERJ6GEYJ822V	1/10W 8.2K	1	
R416	ERJ6GEYJ153V	1/10W 15K	1	
RX301,02	T0RX178A	OPT.IN	2	
S1,2	RSH1A91ZA-A	SW PROTECT/REFLECT	2	
S3	RSH1A044-1A	SW LOAD OPEN	1	
S4	RSH1A91ZA-A	SW DISC IN	1	
S5,6	RSH1A044-1A	SW LOAD PLAY/REC	2	
S7	RSH1A045-A	SW LOAD TRG	1	
S8	RSP1A023-A	SW TV SW	1	
S401-10	EVQ21405R	SW PUSH	10	
S411,12	RST2A001-2D	SW MARKING/TRAC	2	
SA1	RFKXPG641	GREASE	1	
TH1	RRSP33J103CW	THERMISTOR	1	
VR1	EVM3YSX50B14	VR LASER POWER ADJ.	1	
X1	RSXY10M0M02T	OSCILLATOR	1	
X2	RSXC16M9S03T	OSCILLATOR	1	

17.2. Cabinet Parts Location



Ref.No.22 button cutting illustration.



Cut off the button at ◀— point.

Notes: · We do not supply those items of parts marked ✻.

· About the parts of Ref.No.11A and B, please use after cutting off the part of Ref.No.11 at "Replacement Parts List".

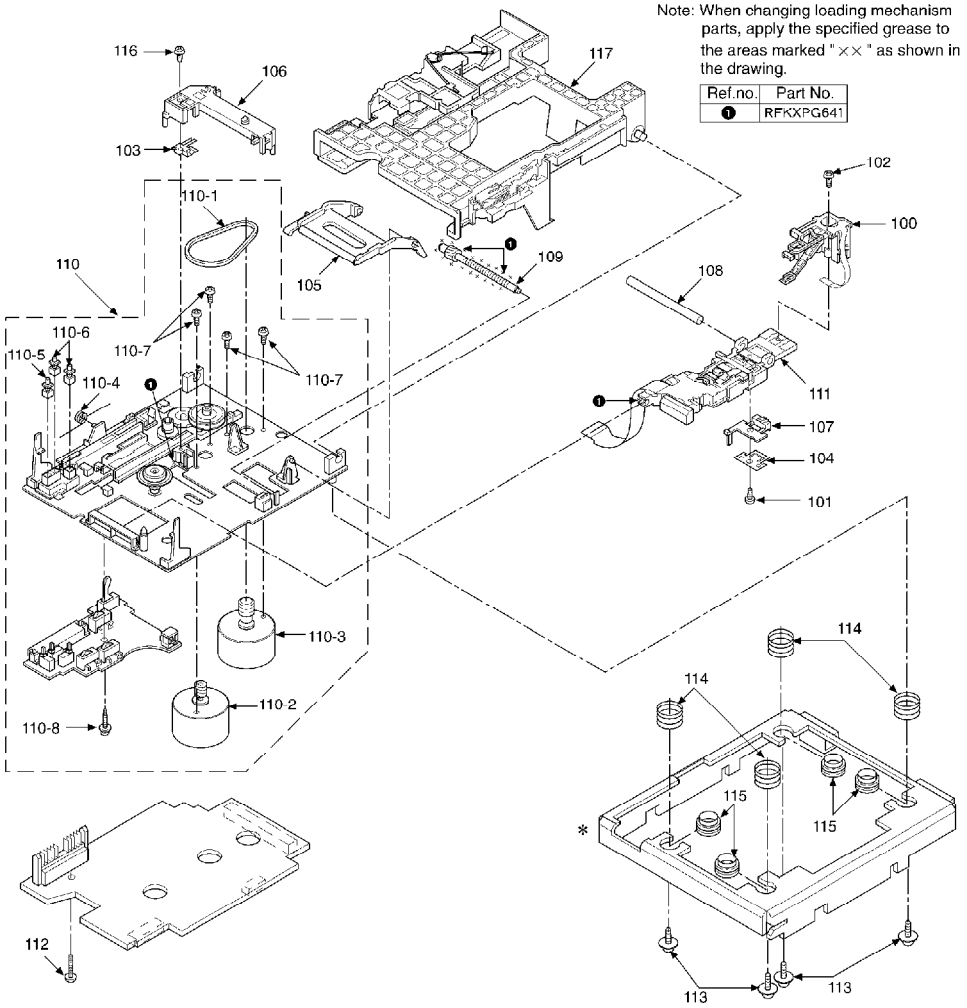
Ref.No.11A : D404 is on the printed circuit board.

Ref.No.11B : D403 is on the printed circuit board.

· About the parts of Ref.No.17A and B, please use after cutting off the part of Ref.No.17 at "Replacement Parts List". (Refer to the illustration of the left.)

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
1	RHD30007-S	SCREW	4	
2	RGK0972-1S	SIDE PANEL(L)	1	
3	RGL0394-Q	PANEL LIGHT(L)	1	
4	XTBS26+8J	SCREW	2	
5	RGK0973-1S	SIDE PANEL(R)	1	
6	RGL0395-Q	PANEL LIGHT(R)	1	
7	XTBS3+8JFZ1	SCREW	13	
8	REZ1048	FFC(30P)	1	
9	RKA0098-K	FOOT	4	
10	RKM0364-1S	CABINET	1	
11	REP2683B-S	LED(L R) P.C.B.	1	
12	RGG0148A-1S	FRONT PANEL	1	
13	RGK0977-2S	MD LID	1	
14	RGL0386-Q	PANEL LIGHT(PLAY)	1	
15	RGL0387-Q	PANEL LIGHT(REC)	1	
16	RGP0642-1S	SUB PANEL	1	
17	RGU1599A-1S	OPERATION BUTTON	1	
18	RHD20010	SCREW	1	
19	RMB0514	SPRING	1	
20	XTB3+5JFZ	SCREW	4	
21	RQLS0104	LASER CAUTION LABEL	1	
22	XTB26+8J	SCREW	4	

17.3. MD Mechanism Parts Location



Note: We do not supply those items of parts marked ✻.

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
100	RED0047-1	MAGNETIC HEAD	1	
101	RHD17021	SCREW	1	
102	RHD17022	SCREW	1	
103	RMC0348	THRUST SPRING	1	
104	RMC0349	NUT PLATE SPRING	1	
105	RML0515	SHIFTER	1	
106	RMQ0750	REF BASE	1	
107	RMQ0751	NUT PLATE	1	
108	RMS0611	MAIN SHAFT	1	
109	RXJ0021	DRIVE SHAFT	1	
110	RXK0249	MECHANISM CHASSIS	1	
110-1	RDV0055	BELT	1	
110-2	REM0077	TRAVERSE MOTOR	1	
110-3	REM0078	LOADING MOTOR	1	
110-4	RMB0548	PRESSURE SPRING	1	
110-5	RMQ0752	DETECTOR PIN(1)	1	
110-6	RMQ0753	DETECTOR PIN(2)	2	
110-7	XQN17+C25FZ	SCREW	4	
110-8	XYC2+FF105	SCREW	1	
111 ⚠	RAF1700A	OPTICAL PICKUP	1	
112	XTW2+6S	SCREW	1	
113	RHD20053	SCREEW	4	
114	RMB0504	SPRING	4	
115	RMG0447-K	DUMPER	4	
116	XTN17+6GFZ	SCREW	1	
117	RXQ0558	HOLDER ASS'Y	1	

Printed in Japan (H990505500 KK/HH)

Order No. AD0002034S2

Service Manual

Mini Disc Deck

SJ-HD505

Area

E.....Europe.

Corrections in descriptions Laser Power Adjustment.
Please file and use this supplement manual together with the service manual for Model No. SJ-HD505(E), Order No. AD9905119C2.

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

1. Guide and Note

- All corrections of “Laser Power Adjustment” have been stated in this supplement manual (see next page onward).
  When making the laser power adjustment, please refer to this supplement manual.
- The meshes points are corrected. Please be careful about when you adjust.

9.4. Laser Power Adjustment

Adjust each laser power: read power for reading (play) and write power for writing (record).

9.4.1. Necessary Instruments

- Laser power meter (Advantest TQ8210 or compatible meter)
- Test disc (Pre-mastered disc RFKV0006 or RFKV0014)
- Recordable disc available on sales root (with music recorded)
- Insulated driver for adjustment such as a ceramic driver
- Jitter meter

9.4.2. Set the Unit to the Adjustment Mode

1. **Perform the item of "MD servo board check" in "Operation Check and Component Replacement Procedures", step 1 and 2.**

Caution

1. **About handling the MD unit**
   - The magnetic head is a precision unit and is very fragile. Do not deform it.
   - Laser diode in the optical pickup may be destroyed by the staticelectricity generated in your clothes or body. Be especially careful with the static electricity.
   - The optical pickup is structured extremely precisely. Do not subject to the strong impact or shock. Do not touch the lens.
2. **About handling the magnetic head**

   When replacing the magnetic head, do not tighten the mounting screw (RHD17022) too firmly. If the screw is tightened too much to deform the resin, the positon of the head is moved, and this affects its recording operation.

   Recommended torque for mounting screw: 700 g·cm +/- 100 g·cm

   Reference: This is the same force as using a screwdriver with a 15-mm diameter grip you fasten the screw naturally with your thumb and index finger.
3. **About the driver for adjusting laser power**

   Use only insulated driver such as a ceramic driver. With the metal driver, it is not possible to adjust properly because of the induction noise. Also, if it short-circuits with the chassis, it may destroy or damage the laser diode.

   Recommended driver: VESSEL 9000 1.8 -30 (Ceramic driver)

Caution on optical pickup:

- The optical pickup and the magnetic head are structured precisely; therefore, they are very fragile. Be careful not to touch them with the edge of the laser power meter.
- The sensor of the laser power meter is a very fine part. Be careful not to touch it to the optical pickup lens.
- The focus point of the laser reaches to 356°F. Therefore, avoid adjusting using laser power for a long time because the sensor of the laser power meter may be burned.
- Do not allow the write power to even momentarily reach or exceed 5.5 mW. Doing so will result in damage to the optical pickup.
- Do not set the unit to the laser power adjustment mode with the MD loaded. Doing so may result in damage to the MD.

9.4.3. Adjustment Procedure

1. Remove the MD unit from the system unit.
2. Short-circuit the no.67 pin (TP77) of the IC10 and GND (TP74) with the lead wire.
3. Set the MD unit in the system unit and turn on the power. The REC and PLAY of the main unit will light up.
4. Slice the sensor cover of the laser power meter. (Refer to Fig.8)

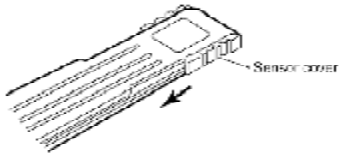

Fig.8

5. Position the sensor of the laser power meter directly above the optical pickup. (Refer to Fig.9.)

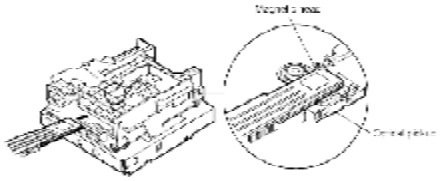

Fig.9

6. Press the CD EDIT button and confirm that the reading of the laser power meter is within the specified range. If it is higher than 600 uW, adjust by turning VR1 and set to lower than 550 uW. (Refer to Fig.10)

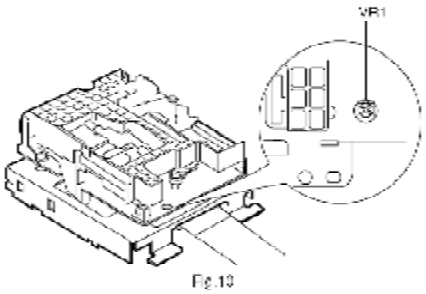

Fig.10

Specifiec range (read power): 600 uW or lower

Caution:

- **Proceeding on to the subsequent adjustment procedure with the read power exceeding 680 uW will result in damage to the optical pickup.**

7. Press the CD EDIT button and read the write power. Specified range (write power): 4.8 mW +/-0.1 mW
8. If it is not within 4.8 mW +/-0.1 mW, adjust by turning VR1. (Refer to Fig.10.)

Caution:

- **Do not allow the write power to even momentarily reach or exceed 5.5 mW. Doing so will result in damage to the optical pickup.**

9. Press the CD EDIT button. The read power will be displayed again. Confirm that the read power is within 540 uW and 660 uW.
10. Then, again press the CD EDIT button. The laser power recorded in the laser ROM will be displayed.

    Confirm that it is within 540 uW and 660 uW.
11. Press the ■ button and exit the adjustment mode.
12. Turn off the power and remove the lead wire between the No. 67 pin and GND. This ends the adjustment mode.

Printed in Japan (H000104200 TN/HH)